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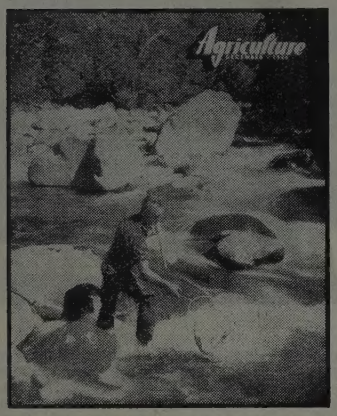
This Month's Cover



Many of the customs of their birthplaces were retained by the early settlers of New Zealand and have continued to be observed by their descendants, and these have included the traditional ways of celebrating Christmas. However, a strong leaning toward a Christmas holiday in the outdoors has developed over the years and fishing, whether in the sea, lakes, or rivers, has many devotees. This month's cover, which has been reproduced from a colour photograph by National Publicity Studios, shows an angler taking a fine brown trout on the Cleddau River in Central Otago.

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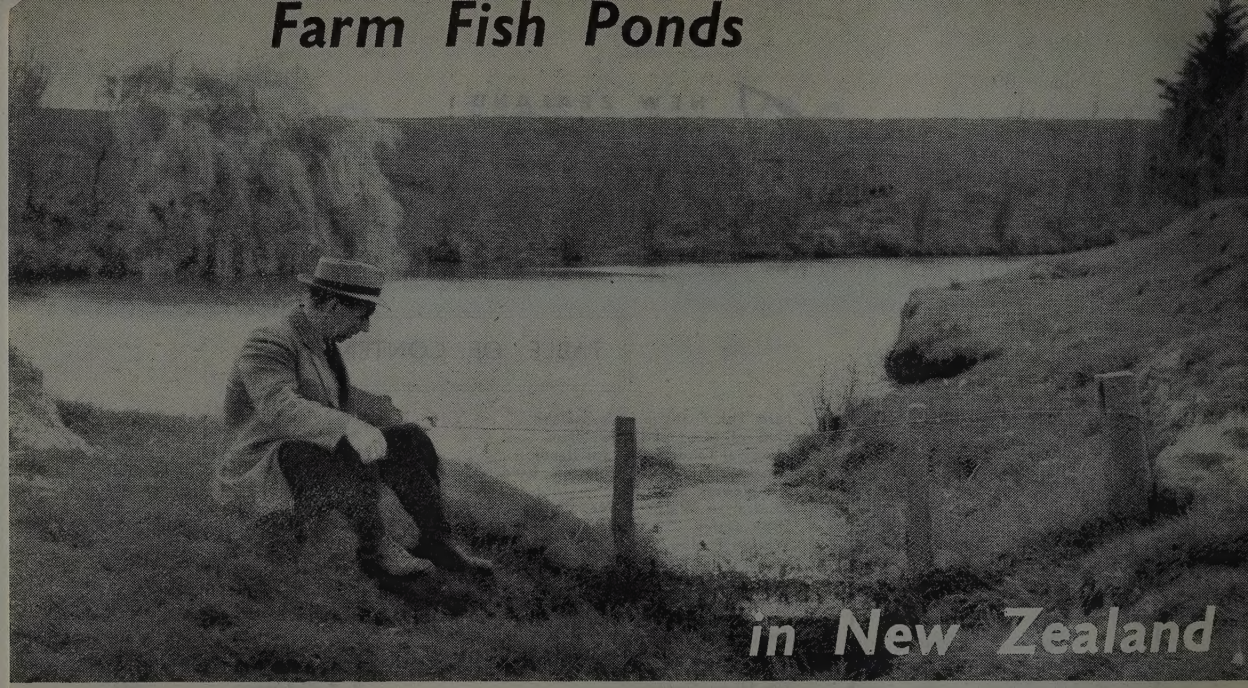
Farm Fish Ponds in New Zealand



INQUIRIES made by individual farmers to various organisations and departments led recently to consideration by officers of the Dairy Board, Soil Conservation Council, Department of Agriculture, and Fisheries Branch of the Marine Department of the possibilities of developing farm fish ponds in New Zealand both for recreation and food production. The following article by D. F. Hobbs, Senior Fishery Officer, Marine Department, Wellington, is a synopsis of information and views prepared by the Marine Department.

THOUGH fish farming is centuries old and in some countries is very highly developed, there is no ready-made system which could easily be adopted for use in New Zealand, and aquiculture would present problems just as varied as those of agriculture. Waters differ just as much in potential productivity as do pieces of land and their management tends to be more complex because of longer food chains (that is, many fish do not feed directly on plant growth as do farm stock, but prey on smaller forms of animal life which eat the plants), and because of predation, differing oxygen and spawning requirements of various fishes, and difficulties of controlling numbers or even tallying stocks at all. There is, too, a lack of available information regarding fish farming in New Zealand of the type easily obtained for land farming.

Much confusion arises because popular accounts of pond farming which reach New Zealand rarely give adequate background facts or draw attention to essential requirements for adopting an established overseas system. In a number of cases tropical or sub-tropical species of fish are involved which can no more readily be transplanted to New Zealand than could tropical fruits for growing on the high tussock lands. Some of the species involved are vegetarian, some omnivorous, and others live on smaller fishes and aquatic bugs. In eastern countries and in Europe most fish are produced for food and not for sport. It is very doubtful if even for food the same species would appeal here. Astonishingly high figures of production per unit area are often quoted without discrimination between crops of fish resulting from natural foraging or from foraging in waters which are artificially fertilised, or again of "stall fed" fish from ponds where both artificial fertilisation and much direct feeding are practised.

Whether or not fish farming is necessary or likely to prove popular in any country depends primarily on economic issues. Where the standard of living is very low, labour is cheap, mammalian meat rarely seen, and marine fish resources scanty or remote, pond farming may be almost essential for survival. At the other end of the economic scale food production of fish is subordinated to recreational needs. Thus farm ponds tend to be most popular remote from coastal areas and where rivers and lakes are too scattered or too poor to provide good, handy recreational fishing.

Overseas Practices

In Europe fish farming has persisted from at least as early as the Middle Ages, chiefly with such species as carp and eels, which have negligible angling value and which in New Zealand would not be esteemed as food. Carp farming in Germany involves in some cases a rotational system whereby periodically ponds are drained, planted in green crops, and then reflooded and stocked. Sometimes sewage effluent as well is used as a source of basic nutrients. However, the production of carp by use of living matter which develops in sewage effluents has usually as its main object the removal of organic matter and consequential purification of waters which later are recirculated for domestic use. Carp when introduced into North America multiplied in sluggish waters for want of exploitation and this necessitated the introduction of expensive control measures. Recently there has been limited commercial utilisation of carp there by immigrants.

Trout production in Europe includes both intensive artificial feeding in small ponds to produce market crops and the stocking of natural waters and major impoundments for recreational use. The records of the little experimental work which has been done on artificial fertilisation of ponds for trout mainly show failure or emphasise serious technical difficulties. For instance, the effort is wasted unless initial acidity of water, where it exists, is first corrected, or if it leads to excessive production of floating plant organisms (phytoplankton).

In China and fairly generally throughout Asiatic countries fish farming has long been practised. More recently it has been attempted in Palestine and North Africa. Apart from carp (a small ornamental species of which thrives in some warm and sluggish New Zealand waters) this farming involves the use of species

HEADING PHOTOGRAPH: A farm pond in the Manawatu district. The wire netting is across the overflow channel.

probably all requiring higher water temperatures than would usually be found in New Zealand. The yield per acre often seems at first to be extraordinarily high—sometimes up to 4000lb. per acre in China, but dropping to a maximum of 1200lb. in Palestine and to 450lb. to 900lb. in the Philippines. Such farming is conducted in warm, shallow, earth ponds and involves considerable labour. Ponds are usually manured with domestic sewage and garbage and commonly green fodder is added either as direct food or to decompose and fertilise the water.

Basically methods are identical with those more recently applied and better documented for goldfish production in the southern states of North America. Indeed such goldfish (a carp species) are one of the fishes intensively cultivated in China. When the very high yields of sometimes a ton or more of fish per acre per annum are examined it is found that they are generally from ponds where direct feeding may be at the rate of 5lb. of food for each pound of fish produced and where also fertilisation is at the rate of 1lb. per pound of fish, a mixture commonly used being one giving 8 per cent. available nitrogen, 8 per cent. available phosphoric acid (P_2O_5), and 2 per cent. potash (K_2O).

Generally the efficiency of conversion of basic nutrient matter into fish food will be higher where the aim of fertilisation is the production of plant matter for direct consumption by the fish than where plant matter must be consumed first by very small forms of animal life, which in turn are taken by larger forms, including small fish, on which the largest fish feed.

Much of the recent publicity on farm fish ponds has concerned such North American fishes as the black basses and bluegill bream. Usually bass and bream are grown in association and the prolific bream produce a crop of small "pan" fish and also serve as food for the larger, predatory bass. Compared with trout, which prefer temperatures of below 70 degrees F., basses are warm-water species which require a minimum temperature of about 65 degrees to spawn and will tolerate 90 degrees. Despite this, when compared with a number of the tropical species cultivated in Asia and North Africa the basses are fish of the temperate zones. They are strong fighting fish, comparable with the trout, and like it take a variety of lures, including fly. Probably, though, they call for less refined angling techniques than the trout. Bass fight better than the European perch, which is also rather inferior to the trout.

An optimum annual yield per acre for bass and bream would be about 175lb., but the usual yield would be very much less. There are conflicting views as to whether the yield of bass ponds can be improved by artificial fertilisation. When, as often happens, the effect is simply to produce a dense "bloom" of microscopic plants, results may be harmful in that food resources are lowered by the reduction of light penetration into the pond. Unless stocks of bass and bream are rigorously controlled, both as to combined weight relative to the food supply and also as to balance between the two species, cropping efficiency is easily lost. Adequate control necessitates use of ponds which can be de-watered or in which complete netting is possible, but efficient netting is difficult to achieve if much rooted vegetation grows in a pond and such vegetation may contribute usefully, though indirectly, to food supplies.

In North America the farm pond for recreational and food uses has quite recently become popular to supplement inland fisheries in natural waters. By New Zealand standards United States interest in angling seems extraordinary, as a high percentage of the public is attracted to angling despite the small size of trout, congested angling conditions, and inferior fish species. The fishing conditions which reasonably satisfy very many United States citizens would not satisfy the average New Zealander, who would have no interest in trout of the sizes most usually taken there and who for years has shown scant interest in much better perch fishing in this country than that available and highly popular in parts of the United States.

New Zealand Possibilities

Recreational fishing in ponds is likely to seem much too tame a sport for the average New Zealander, who derives a good deal of his angling satisfaction not from the capture of fish but from the excuse their pursuit provides him for escaping to back-country lakes and pleasant river settings. Pond fishing is more likely to appeal to farmers' children, and seems likely to have limited interest to adults, except as an introduction to angling which would subsequently lead them farther afield. In the two main islands angling facilities of reasonable quality for some of the best game species in the world are fairly widely distributed. The same food motive which has led to fish farming, particularly in eastern countries, is unlikely to be present where meat is readily available at low prices and where marine fish can in many cases be fairly easily obtained.

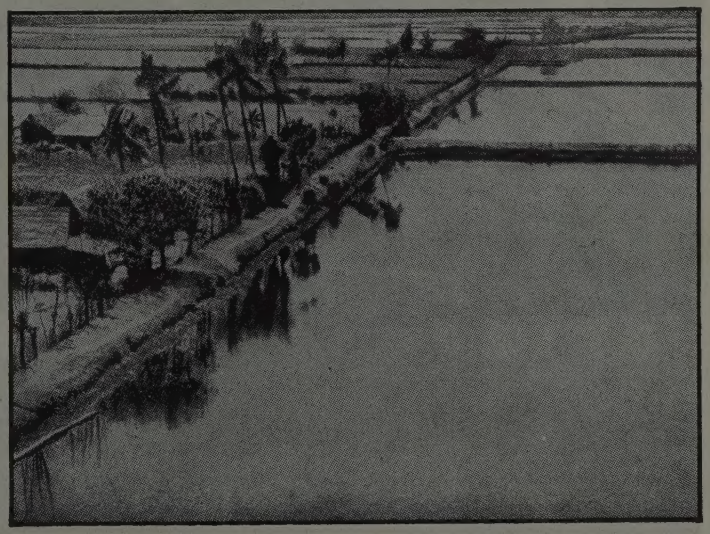
There is thus no reason to expect a boom in pond farming in this country. It could be developed on a limited scale where special need exists and interest is shown. Any planning would have to take into account present and potential fishery uses of New Zealand's natural waters and would be bound by certain legal restrictions.

Inland Fisheries Policy

The Marine Department is generally responsible for the maintenance and development of inland fisheries. Locally administration is in the hands of acclimatisation societies, which any licence holder may join; in a few areas where there is no society the Department of Internal Affairs fulfils the functions of one. Aided by a levy on angling licence fees the Marine Department provides research services. An advisory council, representative of central and local administration and scientific interests, acts as a general co-ordinating and policy-formulating body.

In the South Island the distribution and quality of natural waters are such that moderate to good trout fishing is fairly well distributed in relation to population distribution. Moreover, there are no readily accessible and important classes of water potentially valuable for fisheries development. Present utilisation includes all accessible streams and lakes and in the Otago district includes even the stocking of large dredge holes in old goldfields areas and large flooded gravel pits in Canterbury.

In the North Island the position is very different. The Taupo and Rotorua lakes provide for many thousands of anglers from the main centres of population at Auckland, Wellington, and elsewhere for whom local streams could not cater sufficiently. The extraordinary post-war



[*From Indo-Pacific Fisheries Council Special Publications No. 1*

Brackish water fish ponds in West Java.

increase in angling demand has necessitated some change of emphasis in investigational work with greater concentration on improving the yield of the main central North Island lakes and also on bringing new waters into production. Waters being surveyed and studied with a view to future development include a well-distributed series of about 250 small lakes which extend, with some breaks, up the west coast from Otaki to beyond Dargaville. Most of these lie very close to the coast in old consolidated dune country. Additionally streams in the papa country on the east coast and extensive lower reaches of a few major sluggish rivers offer some possibilities for stocking with species other than trout. Work on these problems is well in hand, but progress is slow, as it is very necessary to check thoroughly before importing and releasing new species, for mistakes in introduction of new species (of which mistakes New Zealand has had plenty of experience) are never easy to remedy. It seems to be fairly widely accepted that the liberation of bass, both intentionally and accidentally, in trout waters in North America has been harmful to the trout fisheries. Once a fish is introduced it is most difficult to prevent its further spread.

Recently the Soil Conservation and Rivers Control Council has shown interest in the possibilities of developing angling in small flood-control and general-purpose farm dams, and at present has in hand the observation and experimental stocking of a few such dams in the Palmerston North area.

Legal Restrictions

Basically because the country's trout and whitebait fisheries are valuable assets, which should not be jeopardised by misguided releases of new species, there are legal restrictions which should be known by anyone desiring to stock waters. The Fisheries Act applies to all streams, lakes, and ponds except "private waters". Where the Act applies trout, salmon, and perch may be taken only during the open season by methods and in sizes and quantities permitted in regulations. A licence is necessary except for the occupier of property fishing on his own land.

"Private waters", to which the Act does not apply, are any lying wholly within the land of one owner, but these do not include natural lakes on the boundary of a property or waters over which an owner simply has riparian rights.

A farm pond having no outlet stream is clearly outside the scope of the Fisheries Act and the owner is free to stock and crop it as he wishes, subject only to the limitation that during the closed season for acclimatised fish in that district he may not take any acclimatised fish away from his own property. But where a lake on a farmer's property has an outlet stream draining through other property the lake is probably not a private water within the meaning of the Act. The obvious intention of the Act is to ensure that the rights of other persons interested in lower waters should not be jeopardised through the actions of one owner farther upstream. Where it is desired to stock a pond from which drainage enters some stream or river, permission must be obtained from the local acclimatisation society if the species desired is one already present in that stream, or from the Secretary of Marine if it is any other species.

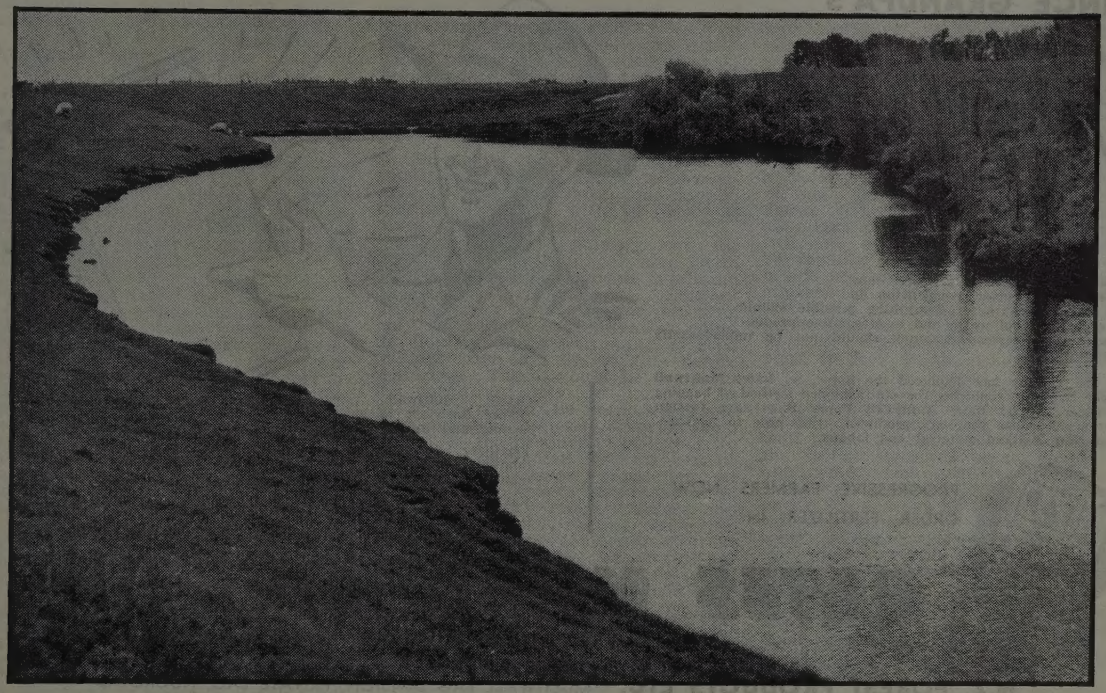
Importations of live fish from abroad are strictly controlled both to prevent introduction of species likely to prove harmful to trout or whitebait fisheries and to lessen the likelihood of establishment of additional parasites or fish diseases. Regulations governing the releases of aquatic organisms can be applied even to private waters. The main purpose is to limit the possibility of, say, fluke-infested snails becoming more widespread.

Construction of Ponds

It is impossible to lay down firm rules for the construction of ponds because often use for fishing would be incidental to other uses. In any case shape, size, and details of construction may depend very much on the lie of the land, availability of water and materials and availability of plant to aid construction. Within limits, however, a pond could be used for such diverse purposes as control of run-off, as a reservoir for fire fighting, for stock watering, and for swimming and boating beside the production of fish and waterfowl. With judicious planning and planting a pond could well be a beauty spot and a recreational and picnicking centre for the farmer and his family and their friends. A pond is not likely to prove an economic proposition if planned for fish alone, and a general purpose pond need not necessarily cost any more than one constructed for fish.

Subject always to elementary rules of hygiene being observed there is a strong case for cropping fish in domestic water supply reservoirs. The taking of regular fish crops is a way of removing organic matter, and the greater the amount of such matter removed the better generally will be the quality of the water for domestic use. Conversely, the purer a water supply is the less will be its ability to produce a good fish crop.

The mobile laboratory of the Fisheries Branch of the Marine Department. This Department is generally responsible for the maintenance and development of inland fisheries.



A pond is not likely to prove economic if planned for fish alone, and a general purpose pond need not necessarily cost any more than one constructed for fish.

To provide reasonable angling a pond should be at least ½ acre or more and should have a maximum depth of not less than 6ft., with some deep water close to the bank so that marginal weed growth would not interfere with fishing. An excessive depth—say, 10ft. to 15ft.—would usually be disadvantageous for food production, but a small pocket of deep water might well afford fish some relief when surface temperatures tended occasionally to rise too high. It is difficult to combine the requirements of fish and waterfowl in the same pond, but a reasonable compromise can be achieved by having a shallow extension at one end for waterfowl and by the provision of nesting cover. The Mallard duck seems better suited to a pond habitat than the grey duck and is much more likely to nest close by.

For adequate control and cropping of stock, and possibly also for control of weeds as a pond matures, it is desirable that the bed of a pond should grade down to an outlet plug which can be screened as water is run off. This is not, however, imperative where the aim is simply to produce a moderate crop. Provided the bed of a pond is kept clear of snags and is fairly smooth and aquatic plants do not develop excessively nets may assist in cropping and controlling numbers. Even without either draining or netting reasonable control of eels and of any excessive quantities of perch can be achieved with baited eel baskets.

Supply of Water

It is not necessary that water should flow through a pond. Indeed under such conditions soluble nutrient matter would not accumulate so usefully as in a pond where the entry of seepage water was balanced by evaporation. However, an artesian bore or a spring supply could assist materially in keeping the temperature within moderate limits and in inducing circulation and thus maintaining plenty of oxygen in the water. A large inflow almost certainly necessitates an outlet to some natural stream course and it is almost impossible to prevent eels gaining access to any pond that has even an occasional overflow to a watercourse. Generally eels are unwanted because they both compete with useful species for food and prey on them.

Ponds are likely to vary quite as much in productivity as land does and if dependent on the drainage from surrounding land, may tend to vary according to the quality of the surrounding land. Commonly they will be less productive in peaty and other sour formations. Water should preferably be neutral or slightly alkaline and should be clear and not turbid. Control dams in small creeks with shifting beds would prove very unproductive, as would also any into which a suspension of clay particles was carried regularly from hillside drainage.

Artificial Fertilisation of Ponds

Artificial fertilisation is wasted if water is passing through a pond, and even where it is not it may have results very different from those desired. Where artificial fertilisation produces a dense flora of microscopic plants and turns the water a soupy green the penetration of light is inhibited and useful forms of food do not develop. Reasonably safe treatment could include the addition of agricultural lime to a new pond if waters were likely to be acid.

A pond when first filled with water may be as barren of food as a newly ploughed field. If it is filled from a small stream, some useful forms of animal life will find their way in, particularly if the stream is a sluggish one. In the first summer such winged forms as midges, water-boatmen, and back-swimmers should also become established. The establishment of useful food organisms could be speeded up and the variety of forms amplified by adding, from an established pond, a few buckets of aquatic weeds including the mullock adhering to their roots. Bullies and koura (freshwater crayfish) can be added, though if the pond is partly surrounded by any narrow, raised sod wall, koura might prove troublesome by burrowing in the wall. This is not, however, a usual occurrence with the New Zealand species.

Mosquitoes rarely cause trouble in natural ponds. They develop mainly in casual waters largely because of their ability to populate them more rapidly than can their natural enemies. The probability is that a few old cans half full of water will produce a far greater quantity of mosquitoes than a pond many acres in extent once the pond has an estab-

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lished aquatic fauna. Ponds of the depth suitable for fish rearing and containing a normal fauna should never cause any mosquito nuisance.

Available Game Fishes

There is no probability of bass or other species being imported in the immediate future or of permission being given for their general release if and when they are imported. This means that for angling consideration must meanwhile be limited to species already in New Zealand and which might be obtainable through local acclimatisation societies. Thus the choice lies between brown or rainbow trout and European perch.

Trout

Trout are widely esteemed and (there is no other word for it) "fashionable" in New Zealand. Perch, which are found mainly in lakes and lagoons at places as wide apart as Taieri, Ellesmere, Wairarapa, Foxton, Hawera, southern Hawkes Bay, and even in Hamilton Lake in the Waikato, tend in most places to be rather an unappreciated asset and one which could be made to yield much recreational angling for which reasonable skill would be required.

The brown trout makes for more skilled fishing than does the rainbow and possibly is tolerant of slightly higher water temperatures. Either trout is superior to the perch as a fighting fish, but both species are inferior to perch as eating fish. Both rainbow trout and perch take a lure more freely than does the brown trout. Though the perch does not take a dry fly like trout, it proves a strong fighting fish if taken with a wet fly on light tackle.

Trout prefer cool and well-oxygenated water; perch will tolerate waters of considerably higher temperature and containing less oxygen. Trout will not spawn satisfactorily in still water and thus regular stocking of a pond is necessary; perch spawn on weed in still water and once they are established the problem is usually one of keeping the stock down by heavy exploitation rather than of any further stocking.

Trout grow fairly fast but at rates which vary extraordinarily according to the density of stock relative to food supply. Most will mature as 3-year-olds when, depending on food supply, they may weigh as little as ½lb. or as much as 5lb. or more.

A fair annual cropping rate for trout would be 20lb. per acre, with 40lb. to 50lb. as the probable maximum under optimum conditions. Efficient production would call for stocking only with such quantities as could develop rapidly for cropping at good average size—say, 2lb. to 3lb.—before maturing. There would be no point in permitting any to mature, as spawning would be impossible and food would be uselessly diverted from growth to the production of eggs. No fixed rate of annual stocking can be laid down because production of waters and numbers of predators in them vary very much. Unless and until experience shows otherwise, stocking should never exceed 100 trout of 6in. or 5000 fry of about 1in. per acre per annum. Until a new pond has matured and weed and food have had some opportunity to develop in it, it would be unwise to exceed half these numbers.

Perch

There is little precise information available on cropping of European perch. Under favourable conditions this species will easily reach 1lb. to 2lb. and exceptional individuals 4lb. Perch spawn in spring and festoon water weeds with ribbons of eggs. In the absence of weed, as in a newly made pond, it is necessary to add bundles of twigs. It is probable that with efficient management a far heavier annual crop of perch than of trout could be taken. Whether the perch, however, would be taken at a useful size would depend greatly on the steps taken to stop this prolific species from multiplying excessively and becoming stunted. Commonly in New Zealand a reasonable proportion of perch reach a weight of 1lb. to 2lb. or more, apparently only where predators (chiefly eels) are sufficiently abundant to keep numbers under control. As eels would to some extent be feeding competitively with perch beside preying on them and are rarely appreciated as food in New Zealand, this form of control is likely to be inefficient. It would be much better to grow a few large trout in the same pond to prey on the young perch or to remove the excess perch when small by netting or by the use of traps of the eel-basket type (which are effective for perch even unbaited), as well as by angling. In most districts the initial stock of perch could be obtained by arrangement with an acclimatisation society. They are very hardy fish and can be transported considerable distances in damp moss in a sack. A dozen or two fish of 4in. to 10in. should within a very few years adequately populate a pond of several acres.

Very small fish are excessively bony, but a fish of 10in. and more is a very good "pan" fish, particularly if it is split open and two fillets are peeled off the skin. A good cropping size is 12in. to 14in. and it might be necessary to destroy a considerable proportion of smaller fish to ensure that sufficient quantities reach larger sizes.

Side-line Fish

Though there is no likelihood of making a fortune out of goldfish, there is so strong a demand for them

To provide reasonable angling a pond should be at least ½ acre in extent and should have a maximum depth of not less than 6ft., with some deep water close to the bank so that marginal weed growth would not interfere with fishing. The ponds illustrated on this page and on page 549, on properties near Palmerston North, were stocked and fertilised by the Soil Conservation and Rivers Control Council in co-operation with the Wellington Acclimatisation Society.

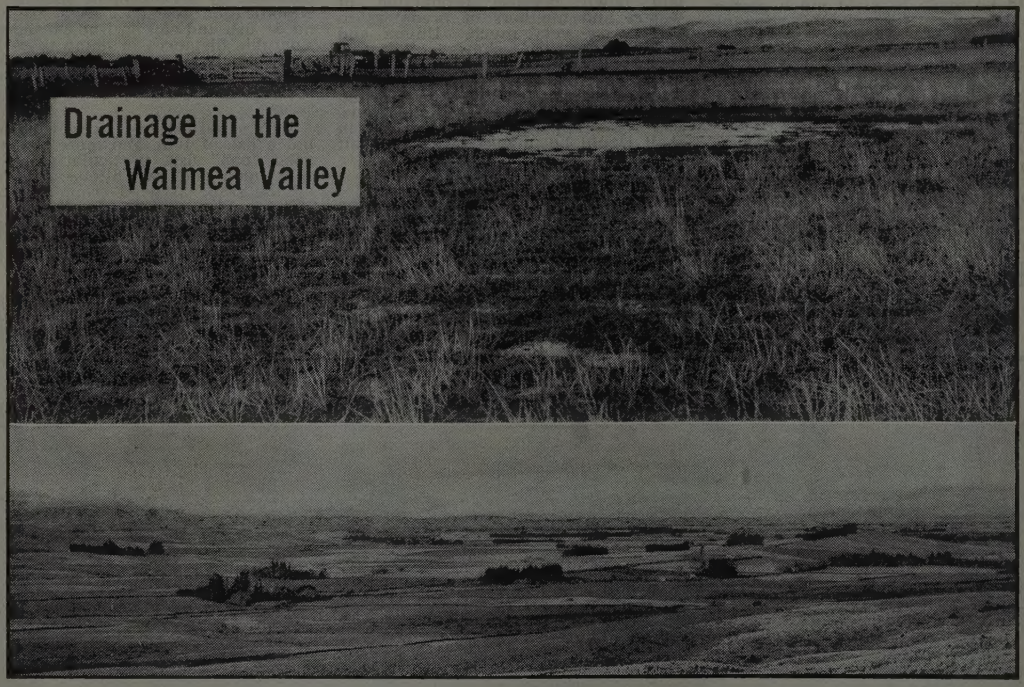
in the larger towns that their production by children in small ponds on farms could be a profitable hobby. In the absence of eels and other predators they multiply rapidly in shallow, warm ponds rich in food. For this species manuring of ponds sufficiently to turn them a soupy green is beneficial. Indeed in countries where they are seriously farmed ponds are so enriched that the dense "bloom" of microscopic plants prevents sufficient light penetrating to enable rooted water plants to grow. As goldfish, like perch, spawn on weeds, it then becomes necessary to put in nesting trays of moss lying on wire netting, and the eggs can be conveniently removed to stock other ponds.

Under good conditions goldfish reproduce so rapidly that frequent cropping is necessary. This can take the form of culling out the dull-coloured specimens, which are usually in a majority, selling many of the small coloured ones for aquaria, and producing a few selected large ones, which sometimes reach 2lb. to 3lb., for ornamental ponds.

The same pond which produces goldfish well is almost certain to be invaded by frogs. However, these can be put to profitable use as well, because sometimes the biology departments of the four University Colleges require consignments for dissection and pay quite well for them. They are usually dispatched alive in perforated cans full of damp weed or moss and are painlessly killed and preserved at their destination.

General Conclusions

Conditions in New Zealand differ from those in countries where fish farming is usual, mainly because in New Zealand alternative sources of meat are readily available to all and most of the country is so abundantly provided with rivers and lakes containing good sporting fish. Only the individual farmer whose interest in angling is quite exceptional and who is remote from any good angling water is likely to find it worth while to develop a pond especially for angling. Much more commonly there would be use for general purpose farm dams. These, in addition to meeting more material farm requirements, could be beautified by planting and developed for family recreational needs, which could include swimming, boating, and angling. According to taste the same pond could be to some extent useful for waterfowl either as a sanctuary or for shooting. Suitable species of fish for angling and for food are obtainable through local acclimatisation societies. Anglers and shooters who are members of such bodies are so much dependent on the good will of the farming community both for access and for protection of fish and game that the sympathetic interest of acclimatisation societies is likely to be readily forthcoming.



Drainage in the Waimea Valley

THE Waimea Valley in northern Southland consists of numerous soil types most of which have one feature in common—a very tight and impervious subsoil which causes excessively wet soil conditions during winter. The result is that spring cultivation is delayed, cereal crops are sown later, and this delays the harvest, which often becomes difficult because of wet ground conditions. With winter feed crops a big percentage of the crop is lost during feeding off. These soils, which are estimated to cover 76,000 acres dry out badly during summer. It is commonly believed that these soils cannot be drained, because they are underlain by a continuous layer of ironstone pan, but this is not true.

The Waimea Valley has areas where ironstone formation is more prevalent than is usual, but ironstone formations can be found in most soils at specific places and particularly in soils with a clayey subsoil. Several areas of 30, 40, and 50 acres throughout the Waimea Valley have been drained successfully with spectacular results by mole drainage in association with tile drains, and these areas have paved the way for large-scale field drainage undertakings which it is considered will eventually increase the productive area by at least 80 per cent.

The illustrations above show typical wet conditions in the Waimea Valley (upper) and a general view of the valley (lower).

—*K. L. MAYO, Instructor in Agriculture, Department of Agriculture, Invercargill*

Cuts of Meat and Their Uses

MOST farmers slaughtering for their own consumption usually kill a sheep or lamb, mainly because the quantity of meat obtained can be readily consumed fresh. This continual use of mutton detracts from its appeal, and its appearance with monotonous regularity on the table makes meals both uninteresting and colourless. With the rapid advancement of refrigeration and the trend today toward greater beef production more beef killing can be expected, especially on stations and farms employing much labour. Where farmers can get together to share a body of beef the following directions by A. Sheed, Meat Inspector, Freezing Works, Burnside, will be of great assistance and will show how to share equally and to the best advantage.

AS probably there will be no meat inspection service available, care should be taken that the animal selected for killing is healthy.

During the dressing intestinal organs and glands should be observed for any abnormality or disease. Advice on meat inspection of farm-killed stock will be readily given by meat inspectors in freezing works and abattoirs or by Veterinarians or Livestock Instructors (formerly Stock Inspectors) of the Department of Agriculture.

Jointing a Beef Carcass

The method of cooking the joints is probably one of the important factors deciding the retail cuts. The following is one of the most common methods of breaking down a body of beef in New Zealand at present.

Several joints are removed by being cut off at the seams between the muscles and not so much cutting of actual meat is done as one would think.

Shown on Fig. 2 are the various cuts taken from a side of beef and lettered in order of cutting.

In breaking down a side of beef the first operation is to separate the forequarter from the hindquarter. This is done by cutting through between the eleventh and twelfth ribs, marked A on Fig. 2. The breaking down of the hindquarter and the forequarter is described and illustrated on pages 554 and 555.

Chief Uses of Joints

After the carcass has been broken down joints to suit requirements can be easily obtained. A guide to the use of the different joints of beef, mutton, and pork is given here.

Beef

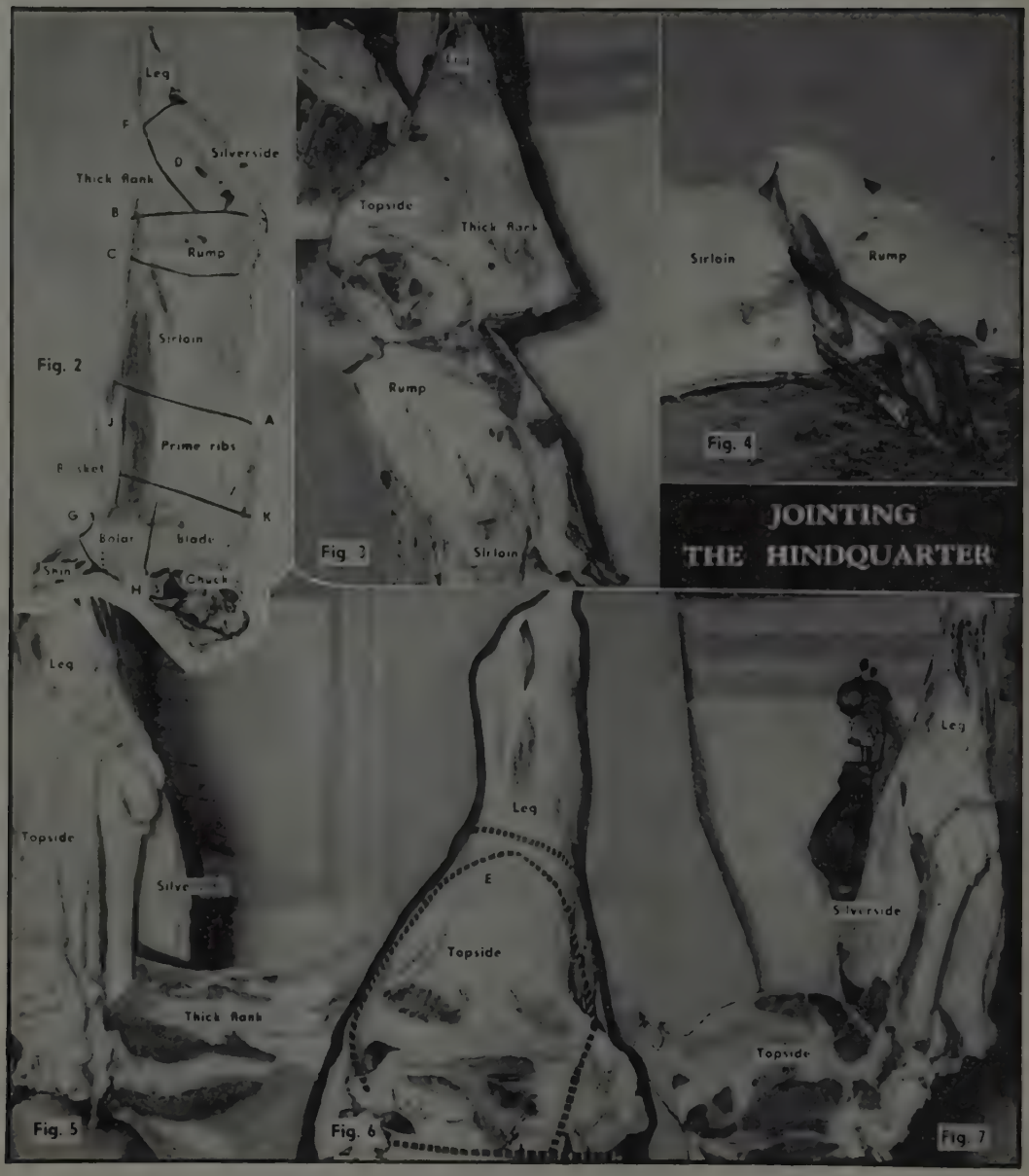
Forequarter	
Joint	**Chief uses**
Shin	Soup or potted meats
Bolar	Chiefly used as corned beef
Blade	Frying or stewing steak
Chuck	Stewing steak or lean roast
Prime ribs (6) (with or without bone) ..	Roasting
Brisket ..	Corned or fresh for boiling
Thin skirt ..	Frying or stewing steak

Fig. 1—Mainly because the quantity of meat obtained can be readily consumed fresh, most farmers slaughtering for home consumption usually kill a sheep or lamb, but with the rapid advance in refrigeration and the present trend toward greater beef production more beef killings can be expected, especially on farms and stations employing much labour.

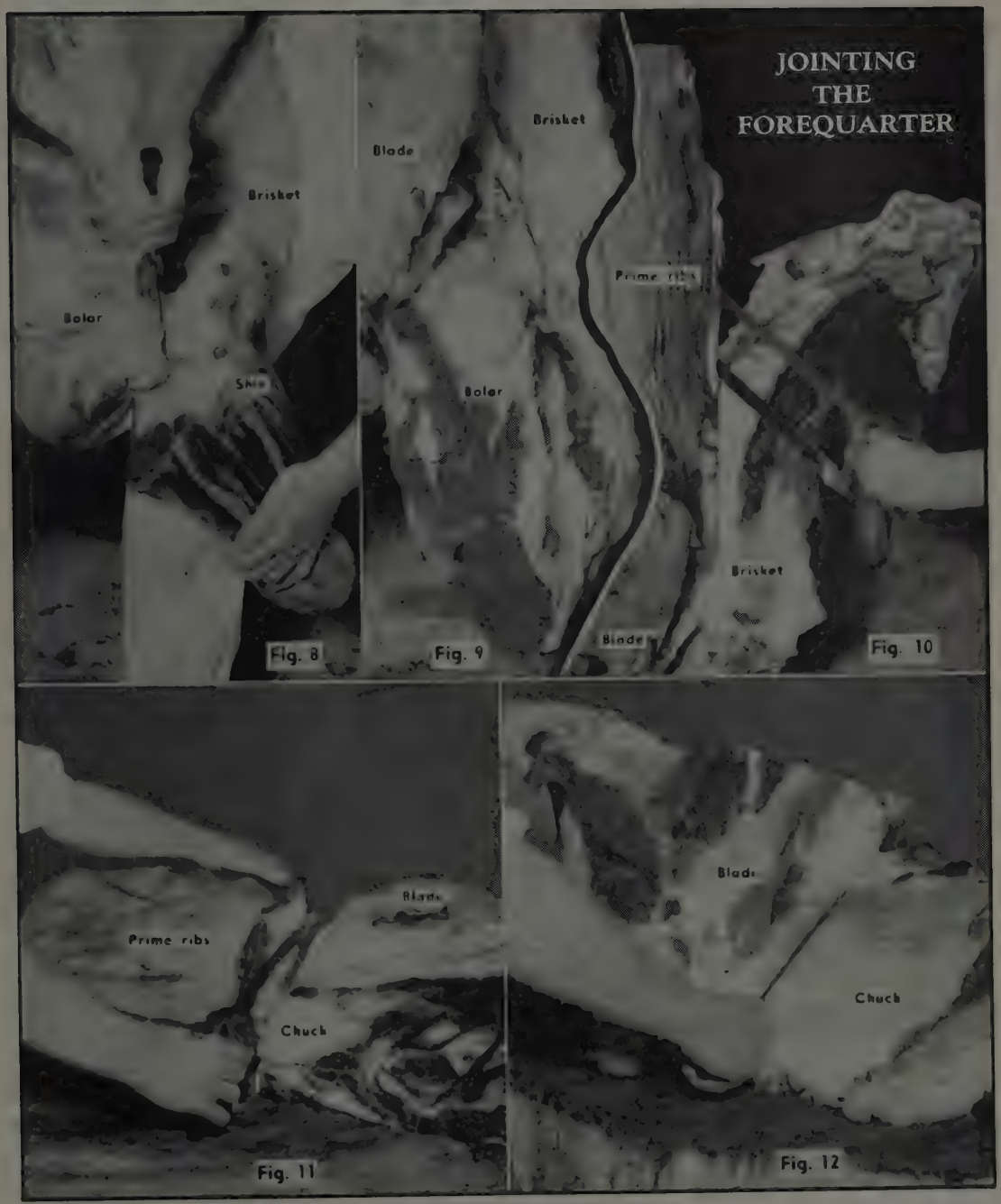
Hindquarter	
Joint	**Chief uses**
Rump or undercut	Frying or grilling steak
Sirloin	Roasting
Wing rib (twelfth or thirteenth rib)	Roasting
Thick flank ..	Frying or braising steak
Topside ..	Frying or braising steak or roasting joints
Silverside ..	Corned beef
Thick skirt ..	Frying or stewing steak

In a test to ascertain the weight percentage of each cut a shorthorn bullock of 720lb. was used. From a side of 360lb. cuts in conformity with normal trade practice gave the following weights and percentages.

Cut	Weight lb.	Per cent.
Rump steak	15⅝	4.305
Fillet steak	4⅝	1.319
Skirt steak	2¾	.763
Blade steak	8¾	2.430
Thick flank steak	13¾	3.819
Topside steak	20¼	5.625
Stewing steak	32	8.888
Sirloin and wing rib (boned and rolled)	31	8.661
Rib roast (6 ribs boned and rolled)	38	10.555
Brisket (corned roll) ..	28¼	7.152
Corned round (bolar) ..	14½	4.027
Corned silverside	22¼	6.180
Leg	13¼	3.680
Shin	9½	2.638
Kidney	1¼	.347
Trimmings	6½	1.805
Fat trimmings	20½	5.694
Bones	53¼	14.791
Suet	18½	5.125
Cod fat	5⅝	1.597



A on Fig. 2 shows where the hindquarter is separated from the forequarter. B on Fig. 2 shows where the rump and sirloin are removed from the buttock. This is done by cutting longitudinally through the hip joint and sawing part of the pelvis bone (see Fig. 3). C on Fig. 2 shows the division line between the rump and sirloin. The rump is separated from the sirloin by cutting through hard against the rump bone on the sirloin side and sawing through the vertebrae (see Fig. 4). D on Fig. 2 shows the thick-flank seam mark on the outside of the buttock. The thick flank is removed from the buttock by cutting into the femur from the inside and at the seam shown on the outside (see Fig. 5). E on Fig. 6 shows the seam mark where the topside is removed from the buttock. Fig. 7 shows the topside being separated from the silverside at the dividing seam; note that the aitch bone is left on the topside. F on Fig. 2 shows where to cut through the femur and tibia (knee joint), separating the leg from the silverside.



G on Fig. 2 shows where to cut through between the humerus and radius joint to remove the shin from the forequarter (see Fig. 8). H on Fig. 2 shows where to cut through between the scapular and humerus joint, removing the bolar from the forequarter (see Fig. 9). J on Fig. 2 shows where to cut the brisket off. The dotted portion of the line indicates the bolar, which has to be removed first. Fig. 10 shows the brisket being sawn from the forequarter. K on Fig. 2 shows the line of division between the prime ribs and the chuck (the blade is still in place). The prime ribs are removed from the chuck by cutting through between the seventh and eighth ribs, leaving a set of six prime ribs (see Fig. 11). The last step in breaking down a forequarter is to remove the blade from the chuck by cutting through the seam between these parts (see Fig. 12).

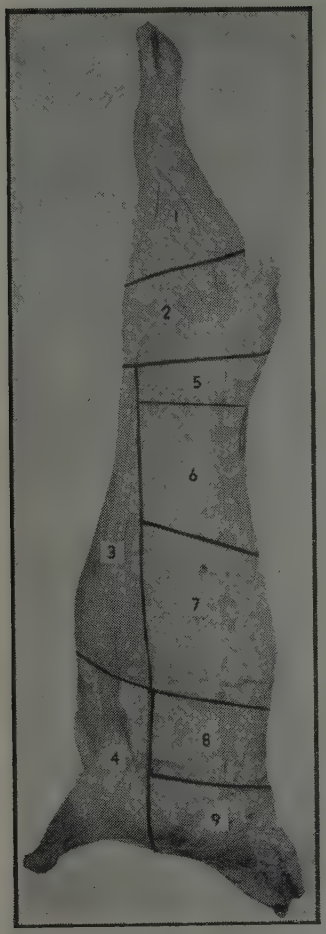


Fig. 13—Mutton joints. 1—Shank-end leg. 2—Thick- or fillet-end leg. 3—Flap. 4—Shoulder. 5—Chump-end loin. 6—Middle loin. 7—Rib-end loin. 8—Neck. 9—Scrag end of neck.

There would of course be slight variations in the percentage weight of corresponding cuts in different breeds of cattle.

The type of bullock to be preferred is the one that gives the higher weights of the choicer cuts.

As may be seen from the chart on page 553, the choicer cuts are mostly found on the hindquarter and this and the fact that the hindquarter carries less bone weight than the forequarter make a heavy hindquartered bullock the most profitable.

Mutton

The divisions into which a mutton or lamb carcass should be broken down are shown above. The methods used are similar to those described for beef.

Chief uses are as follows:—

Joint	Chief uses
Shank-end leg	Boiling or roasting
Thick- or fillet-end leg	Roasting
Flap	Stewing
Shoulder	Roasting
Chump-end loin	Chops or roasting
Middle loin	Frying or grilling chops
Rib-end loin	Frying chops or cutlets
Neck	Stewing chops, roasting or boiling joint
Scrag end of neck	Stewing

Pork

The divisions into which a pork carcass should be broken down are shown at right. The methods used are similar to those for beef. Chief uses are as follows:—

Joint	Chief uses
Leg	Fresh for roasting; pickled for boiling
Belly	Pickled for boiling
Hand	Pickled for boiling
Chump-end loin	Roasting
Middle loin	Frying chops or roasting joint
Rib-end loin	Frying chops or roasting joint
Shoulder	Fresh for roasting; pickled for boiling
Neck end	Fresh for roasting; pickled for boiling

Brine Curing Meat

As well as providing a tasty change from fresh meat, brine curing will also be a solution to storage difficulties. The time the meat can be stored will depend on the method used.

A brine is essentially a solution of salt in water to which other chemicals are added for special purposes. The other chemicals are saltpetre (sodium nitrate), flavouring agents or spices, and sometimes sugar. The salt absorbed into the meat is responsible for the main flavour and secondarily for a preservative effect.

Saltpetre is added to the brine. This substance under the action of bacteria changes into nitrite, which combines with the haemoglobin to produce an attractive pink colour in the meat, which becomes fixed on cooking. This explains why a freshly made brine will not produce an attractive product until this change has taken place.

When spices are used they should be boiled in water for an hour and the liquid strained before it is added to the brine.

The strength of the brine is determined by the amount of salt it contains per gallon of liquid. As salt is added to the water the weight of the solution will increase more rapidly than the volume. In fact the salt disappears into the liquid. This causes an increase in the density of the liquid, which can be measured by a salinometer. This instrument has superseded the old-fashioned method of determining the density of pickle by floating a potato, a system manifestly open to great inaccuracy. The salinometer can be purchased from any butchers' suppliers agency for a few shillings.

When a quantity of water has dissolved as much salt as it will hold it is said to be 100 per cent. saturated, and this is marked on the salinometer as 100 per cent. If the same quantity of water contained half the amount of salt, it would register 50 per cent. Pure water contains no salt and registers 0 per cent.

A 60 per cent. general purpose brine may be made by dissolving 20lb. of salt in 10 gallons of water; to this add 6oz. of saltpetre. The saltpetre must be dissolved in boiling water before being added to the brine. As

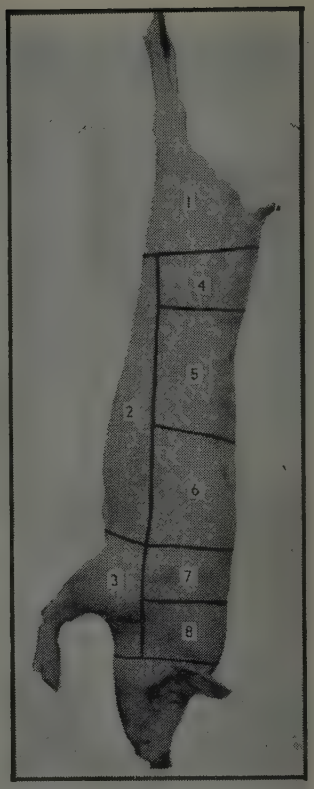


Fig. 14—Pork joints. 1—Leg. 2—Belly. 3—Hand. 4—Chump-end loin. 5—Middle loin. 6—Rib-end loin. 7—Shoulder. 8—Neck end.

meat is brined the solution is continually weakened by loss of salt and will require to be built up with salt from time to time. The addition of ½oz. of salt per gallon will increase the strength by 1 per cent. and a proportionate amount of saltpetre will also require to be added.

The time of brining varies with the size of the meat and the strength and temperature of the brine. If the temperature is too high, the centre of the meat may turn bad before the brine can penetrate. On the other hand should the temperature be too low the meat juices will congeal, thus retarding the brining and producing the same result. The ideal temperature is 38 to 40 degrees F. and at this temperature brining will be slow and there will be much less tendency for the brine to sour. To brine cure a leg of pork or mutton with the bone in it is advisable first to pump some brine into the centre of the leg before putting the leg into the brine tub.

As cut surfaces of meat are quickly contaminated by putrefactive organisms, it is a good plan to wash joints in cold running water before placing them in brine. This will remove surface germs and open the texture of the meat, making it more receptive to the brine.

Marginal Lands Board Assistance

DEVELOPMENT of certain types of farm land has often been hampered because of the difficulty of securing capital owing to the very nature of this land. This problem associated with so-called marginal lands was recognised by the Royal Commission on the Sheep Farming Industry which made its report in 1949. Under resulting legislation the Marginal Lands Board was set up and this board is now giving financial assistance under a wide range of conditions. This article by D. M. Greig, Director-General of the Department of Lands and Survey and deputy chairman of the Marginal Lands Board, explains the board's policy and shows that the belief among some farmers that financial assistance is available for the improvement of certain classes of sheep country only is a misconception.

THE Marginal Lands Act 1950 gave the Marginal Lands Board extraordinarily wide powers, both as to the purposes for which loans could be advanced and the terms and conditions of such advances. Broadly the only restriction of the board's discretionary powers affecting borrowers is on interest rates. These are fixed by the Minister of Finance at present at 5 per cent. on first mortgage and 5½ per cent. on any subsequent mortgage securing current account advances by the board. If these current account advances are later amortised and secured by a table mortgage, the interest rate is reduced to 4⅝ per cent. with a concession to 4½ per cent. for prompt payment on first mortgage and 5½ per cent. with a concession to 5 per cent. on any subsequent mortgage.

Some complaints have been made that these interest rates are too high, but a comparison with the ruling rates of the State Advances Corporation and other lending institutions on first-class securities will show that this is not so.

Early Policy Decisions

At the inaugural meeting of the board certain policy decisions were made with a clear understanding that these would be subject to changes and additions according to circumstances as the board's activities developed. The basic decisions were:—

1. That the board was not a financing institution established to lend money to credit worthy borrowers for making profits and because of this, and the fact that the community was already adequately and efficiently served by such institutions, it would not compete with such institutions. It was determined therefore that an applicant for marginal lands finance must first satisfy the board that he was unable to secure assistance through the normal lending channels.

2. That advances would not be made for the development of properties which, even when fully developed, would still be uneconomic because of their size.

3. That a plan of full development to an economic stage would be required from any applicant. This would not necessarily embrace the development of the whole property, but the board was opposed to lending money for partial development which would not bring the property to an economic stage.

4. That advances would be made only to applicants whom the local committees (provided for in the Act) recommended as persons of trust and worthiness and who had the qualities essential to carry out the development programme.

5. That, subject to the foregoing, advances would be made for the development of any type of farm land the production of which could be increased.

It was also decided that the board would not attempt through its administrative department to establish an organisation to map marginal lands on a district basis. This decision was made not because of any lack of appreciation of the value of such surveys, but simply because similar information was already being collated by the New Zealand Meat Producers Board and the New Zealand Wool Board and by the Department of Agriculture. These organisations readily agreed to make available any information the board required.

Priorities

In the first year of active operation by the board Parliament voted £250,000 for the board's purposes. However, by the time applications were lodged and examined a substantial part of the year had slipped away. The total advances approved by the board in the first financial year (1952-53) amounted to £281,060, but, of course, some of these related to programmes spreading over 3 to 5 years.

As no Government or other agency could make all the unproductive lands of New Zealand productive overnight or provide sufficient finance for such a purpose, it became necessary to consider priorities and, at the same time, in individual cases, to approach mortgagees, stock and station agencies, and banks to ascertain whether they would knit their activities with those of the board by agreeing to provide stock, restrain from unnecessary demands for reductions in their accounts, and so on, and so by a joint effort make a success of particular cases.

Priorities are not easily established without a feeling of hurt and frustration by those who are not preferred and the board had the added difficulty that its main job was to increase production without necessarily determining by whom. A few large propositions could make heavy inroads into the funds available, though perhaps achieving the objective of increased production, and many deserving applications would be excluded. It was therefore decided that the most worthwhile objective would be to concentrate mainly on farms which were capable of being made fully economic units but which today, even with high prices, were barely economic.

Apart from any consideration board members may have thought to be due to good farmers who were just unable to provide sufficient security to the normal lending institutions for further advances for improvements, the board felt that to lift such farms to a definite economic level would provide a buttress against a recession in prices. If this were done, production from them would continue, whereas if the farms were left at their present low production, even that would be lost to the country if any substantial drop in prices occurred.

These further policy decisions were then made:—

1. That the board, though still willing to advance monies on second and third mortgages, was not prepared to take over existing mortgages, except in exceptional cases. Where control or change of stocking was of first importance to a programme of development the board expected existing mortgagees to play their part if an advance was to be made by the board.

2. That within the bounds of the monies available to the board, but without necessarily denying consideration of any proposition, the board would endeavour first to bring to an economic level existing low-producing farms capable of improvement.

Loans for Variety of Purposes

In pursuing this policy the board has lent monies for a very wide range of purposes associated with land development. These have included housing, farm buildings, fencing, plant, tractors, grass seed, fertiliser, contract cultivation, draining, and scrub clearing. Below is a summary at 31 March 1954 of the applications considered, the number declined, the amount advanced, and an estimate by local committees of what a successful outcome of the various development programmes means in increasing productivity.

Individual farmers who applied for assistance	352
Cases deferred	2
Finalised	350
Approved by the board	182
Declined by the board	134
Approved, but not proceeded with by applicants	34
	350
Amount approved and accepted	£597,246
Monies actually expended 1952-53	54,843
Monies actually expended 1953-54	189,726
	£244,569
Estimate by committees of results from expenditure:	
Unimproved land grassed	10,010 acres
Run-out pasture renewed	6,900 acres
Inferior pasture improved	4,500 acres
Estimate by committees of additional stock that will be carried:	
Dairy cows	2,300
Sheep	49,000
Run cattle	3,700

Despite the generally sound financial position of farms today, there is considerable scope for the type of assistance being given by the Marginal Lands Board. Reluctance of lending institutions to finance development of marginal land with latent possibilities has resulted in considerable areas remaining marginal and the farmers on them "marginal" farmers. This is not a criticism of these farmers, but simply a reflection of their inability in many instances to finance improvements. The aim of the Marginal Lands Board is, in co-operation with lending institutions, to provide the assistance to lift this land out of the category to which it is anchored by inadequate finance.

Development of Tall Fescue Land in Central Hawkes Bay

By F. H. COLLIN, Fields Instructor, Department of Agriculture, Hastings

IN parts of Central Hawkes Bay there are considerable areas of undrained peat lands which are potentially highly productive but which at present grow little more than swamp vegetation with a great deal of tall fescue. That these areas can be developed has been amply demonstrated by Mr. H. Brownrigg, Te Hauke, who has successfully grassed about 500 acres of such country over the past 20 years.

ONE of the difficulties usually associated with the development of land infested with tall fescue is the destruction of the rank growth, the presence of which makes ploughing or discing almost impossible. This rank growth is usually destroyed by burning or blading with a road grader or bulldozer. Mr. Brownrigg has approached the problem in a novel manner, his procedure consisting of subdividing the area into blocks of 50 acres and removing the rank growth with large mobs of horses.

These 50-acre blocks were made long and narrow and were bounded by open drains, which were fenced. As soon as a block was dry enough a mob of 200 horses was turned on to eat out the fescue and consolidate the surface. At first cattle were used, but the losses through foot trouble were too heavy. Horses are particularly effective in this work and soon get fescue well under control. As each block is grazed down the horses are moved to another, but may be returned if regrowth is sufficient to warrant further grazing.

Grazing begins in late autumn and may go through to mid-spring, when conditions should be dry enough for the first giant discing. A double cut is given during October and the area is then left for a few weeks to dry out. Harrowing by heavy chain harrows follows to break down the fescue clumps and remove earth from them, after which as much as possible of the surface matter is heaped and burnt. If there has been much growth of young fescue, large mobs of wethers may be brought in to eat it out.

In late December a further double cut with the giant discs is given and it is again followed by heavy harrowing and burning of rubbish. As conditions are much drier at this time, care has to be taken to keep heaps small so that the peat does not take fire. Subsequent cultivation is done by tandem discs, harrows, and roller to develop a good seed-bed so that sowing can take place in late February or early March.

The essential purpose of the cultivation is to destroy fescue, and this is achieved under the normally hot and dry summers of this district by continuing this cultivation right up to the time of sowing.

Pasture Management

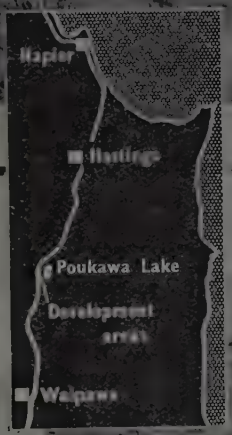
Management of the sown pastures is just as important in fescue elimination as is the early eradication procedure. To keep pastures clean Mr. Brownrigg practises mob stocking with large mobs of wethers, and by such grazing he has kept his pastures practically free from fescue. An interesting contrast is provided by an area which he developed some years ago and subsequently disposed of. This area, which has been set stocked for several years, has now reverted to dense tall fescue, whereas the adjoining fields under mob stocking are quite clean. Obviously, therefore, set stocking must be avoided and mob stocking practised if fescue is to be kept out of improved swards.

The success attained by Mr. Brownrigg with a block of 500 acres prompted the owner to embark on a much more ambitious scheme in which he is developing a further 1300 acres of similar country at the rate of 300 acres each year. When it is realised that this country in improved swards will carry 6 sheep per acre without much topdressing the importance of developing all such blocks in the drive for greater production will be fully appreciated.

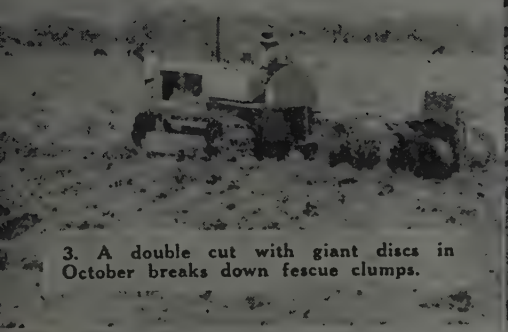
HEADING PHOTOGRAPH: Developed swamp land on right and undeveloped on left.

STAGES IN DEVELOPMENT OF TALL FESCUE LAND

1. Typical fescue infested land before development.

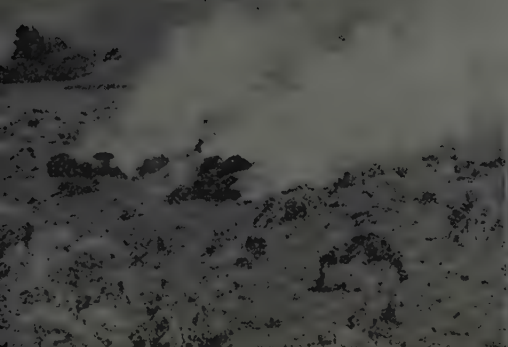


2. On and off stocking with horses at 4 to 5 per acre reduces fescue to a manageable stage.

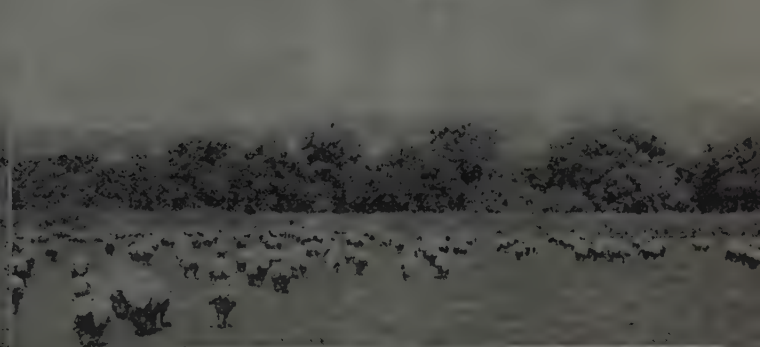


3. A double cut with giant discs in October breaks down fescue clumps.

4. Heavy harrowing breaks down fescue clumps.



5. Fescue clumps being burnt off after first discing and harrowing.



6. Mob stocking with wethers maintains clean pastures free from fescue.

Freeing a Bogged Tractor

GETTING a tractor bogged is a comparatively easy thing to do, but the operator should make sure that he does not take any undue risks when attempting to get the tractor out. The illustration above shows a common occurrence which could have serious consequences. When the tractor was being backed into the silage pit the front wheel slipped over the low bank and into the stream. Each move, whether backward or forward, was forcing the tractor wheel further down into the stream. Owing to the slight down grade from the pit entrance to the stream the weight of the trailer was also tending to push the tractor further into the stream; this would have been intensified had there been a heavy load of silage on the trailer.

The safe method of freeing the tractor is shown in the illustration below. The trailer should be unhitched and the tractor towed out with another (in this case the neighbour's). A farmer should make sure when he is selecting a site for a silage pit that there is sufficient space left at the entrance for manoeuvring a tractor and trailer. Space which may seem adequate under the dry conditions of summer may not be sufficient when it comes to feeding out the silage in winter.

—W. FAITHFUL,
Fields Instructor,
Department of Agriculture,
Invercargill

Trials on Winter Feeding of Hoggets

TURNIPS play an important part in the winter feeding of sheep in Otago and Southland, where they are valued for their reliability and carrying capacity. Hay is also regarded as a basic winter ration, though its food value is too low for other than maintenance. Continued feeding of hoggets with one root crop is not widely practised, a diversified diet, usually with a hay supplement, being generally preferred.

THE results of two seasons' trials at Invermay have cast some doubts on the benefits of supplementing the turnip diet of hoggets with hay. These findings support those of T. K. Ewer at Kirwee, Canterbury, where in several trials no increase in liveweight resulted from the feeding of a hay supplement.

Trial in 1952

In the winter of 1952 one of two comparable groups of 30 ewe hoggets was fed soft turnips for 4 to 5 hours daily with a run-off to bare pasture and access to average-quality meadow hay fed in racks. Hay consumption was 0.9lb. per head daily. The other group remained enclosed on a turnip break without supplementary feed and without run-off for the entire feeding period of 10 weeks. These treatments resulted in an average liveweight increase of 18lb. per head in favour of the unsupplemented-feed group unaccompanied by any adverse effects on stock health. Fleece weights were increased by 0.6lb. per head.

Trial in 1953

In 1953 the trial was repeated in a modified form. As before one group remained without supplementary feed on the turnip break, a second was fed lucerne hay in racks on the break without a run-off (hay consumption averaged 0.8lb. per head daily), and a third had free access to turnips in a large break unfenced from rough hill grazing. Group liveweight gains of 21lb., 14lb., and 9lb. respectively were recorded in a 12 weeks' feeding period, which again showed the superiority of the unsupplemented-feed group. Though turnips are low both in protein and in total dry matter, their food value when fed alone was sufficient to maintain a satisfactory rate of growth.

Hay assists in maintaining winter carrying capacity and may reduce turnip requirements. Hoggets should receive preferential feeding in winter, and though hay is well suited to the maintenance of breeding ewes, these trials suggest that its use would be better restricted to this class of stock. Hoggets should be kept growing steadily if winter mortalities are to be reduced, and where cull 2-tooths are sold their better condition and heavier fleeces can pay dividends.

Further work is continuing with other supplements.

—K. H. C. LEWIS,
Research Officer, Department of Agriculture Invermay Research Station

Control of Wasps in New Zealand

EUROPEAN wasps (*Vespula germanica*) made their first appearance in New Zealand in 1945. Experience has shown that total eradication is impossible, owing to their habit of nesting in inaccessible places and because their spread cannot be prevented, as hibernating queen wasps may be carried about the country in many kinds of merchandise. The public should, however, take measures to reduce the wasp population and retard their spread as far as possible, as they may cause much annoyance while searching for and robbing sweets such as ripe fruit, jams, and honey in summer and until late in autumn.

WASPS of this species are easily identified by their yellow bodies and black markings on their abdomens. The worker wasp is slightly longer than a honey bee and the queen wasp is about twice the size (Fig. 2).

A maximum of control can be achieved only if the public endeavour to locate and destroy all wasp nests on their properties as soon as they are discovered and also kill every queen wasp found in hibernation or on the wing.

This work must be accepted as the responsibility of the individual or local authority affected as is the case with other pests.

When the occupiers of property are themselves unable to undertake the work or arrange for outside assistance the Department of Agriculture will assist when requested by nominating persons or firms who operate wasp extermination services within the area.

Destruction of Queen Wasps

Many young queen wasps are reared in each nest during autumn, and after mating they leave the parent nest to hibernate in some dark, sheltered place. As each queen is capable of starting a new nest the following spring, all queens should be destroyed whenever they are discovered. Some of the places favoured are: Under loose bark on trees, under sacks hanging on fences or stacked in piles in sheds, under stack covers and roofs of buildings, in clothing hanging in open sheds, and in piles of stacked timber. Hibernating queen wasps, which may be found singly or in groups, are easily caught and destroyed by crushing. In spring, when queen wasps are more active, they can be killed with suitable swats.

Destruction of Nests

These European wasps usually build their nests in the ground. Occasionally, however, wasp nests are built on the limbs of trees and other exposed surfaces and within the roofs or walls or under floors of dwellings. Various methods for the destruction of wasp nests may be used successfully according to their location.

Nests in the Ground

The only indication of a wasp nest in the ground (Fig. 1) is a small opening at the surface from which wasps can be observed on the wing coming and going. The following methods may be used to destroy a nest in the ground:—

1. Petrol method: The use of motor spirit as a killing medium is usually effective where the passage from the entrance into the nest slopes downward. Where conditions favour the application of petrol pour a quart down through the entrance to the nest and then cover the opening with a sack to confine the fumes.

The petrol should not be ignited.

Best results can be obtained when petrol is used in the evening when most of the flying wasps have returned to the nest.

Diesel fuel is also effective, but a greater volume is usually needed to achieve the same killing effect as with petrol.

2. D.D.T. method: 2oz. of 10 per cent. D.D.T. powder well distributed inside the opening leading to a nest, so that all wasps entering and leaving the nest must come in contact with the powder, is usually effective in killing most of the active wasps within a few hours. A complete kill should not be expected until a week or so later, however, as young wasps may continue to hatch from the combs for some days. A second application of the powder in 7 days is therefore advisable to ensure a complete kill.

Ten per cent. D.D.T. powder is available from chemists, grocers, seedsmen, and all other firms selling agricultural chemicals. The powder can be applied to underground nests at any time of the day, or treatment may be delayed until evening, when the wasp activity has quietened down.

An easy method of applying D.D.T. to underground nests with entrances either at ground level or through gaps in stone or concrete retaining walls is to use a short length of garden hose or similar piping about 3ft. long. Not less than 2oz. of D.D.T. powder is placed into the tube and the loaded end is gently inserted an inch or two into the opening leading to the nest. A strong blow by mouth at the free end of the tube will force the powder, well distributed, down the passageway to the nest (Fig. 3). Care should

Fig. 2—A queen wasp of the *Vespula germanica* species, showing the distinctive markings, which are black on a bright yellow body.

Fig. 1—Wasp nest exposed by digging away a bank.

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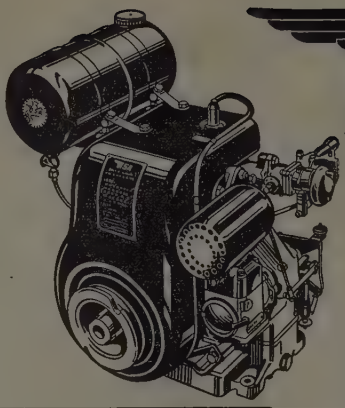

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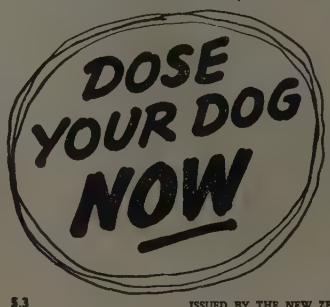

FOR EVERYONE: After handling animals, never put hand to mouth without washing. Take care children wash hands before every meal. Wash carefully all vegetables and fruit eaten raw.

FOR DOG OWNERS: Never throw raw liver or lungs of sheep to dogs. Cut offal into slices and boil first. Otherwise, burn or bury it. Dose your dog with a vermifuge every three months. For this, Arecoline is supplied with your dog license. Rid your dog of worms *now!* Then it is no longer a danger to you or to others.

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be taken not to allow the D.D.T. to come in contact with the mouth. The tube should be prepared before the nest is approached; then a few seconds only is required to administer the powder, after which the entrance to the nest should be left open so that wasps can continue to fly in and out.

3. "Fumite" size 4 smoke generators: These smoke generators, which cost approximately 7s. 6d. each, contain a smoke-generating mixture in which is incorporated the gamma isomer of benzene hexachloride, a substance highly poisonous to wasps. When ignited (with a match) the generators burn quickly and the benzene hexachloride is evolved as a fine smoke. Though the smoke is irritating to the nose and throat, it is comparatively safe to use. Smoke generators of the type suitable for wasp nest destruction are available from firms selling agricultural chemicals.

To light the generator remove the sealed disc at the flanged end, tear away the inner paper cover, and ignite the exposed powder with a match.

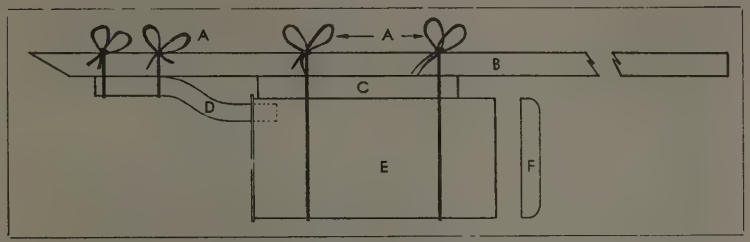
As soon as the generator ignites (shown by the production of smoke) it is immediately placed down into the entrance to the wasp nest, which should then be blocked with earth or sacking to prevent the loss of smoke.

Where smoke generators are used destruction work is best undertaken at dusk, when most of the wasps are in the nest. The nest can be dug out and burnt when all wasp activity has ceased.

Nests in Roofs or Basements

Where nests are established above a ceiling or under the floor of a building and are easily accessible treatment with smoke generators is effective and is best carried out on the inside of the roof or basement in the evening or at dusk.

D.D.T. - B.H.C. smoke generator method: To ensure the introduction of sufficient smoke to kill wasps in exposed nests in buildings and as a precaution against fire, a special type of applicator is necessary. A suitable gun can be improvised, however, with the use of a baking powder tin and a 12in. length of water hose tube. The tin should have a tight lid. Make a hole in the bottom of the tin near the outer edge just large enough to fit the rubber tube into and make a tight seal. When this unit has been securely tied with twine to a long stake as illustrated (Figs. 4 and 5) the



Figs. 4 (above) and 5 (below)—Applicator gun attached to stake for destroying wasp nests that are exposed within the roofs or basements of buildings or nests on trees and surfaces such as clay banks or rock faces. The design in Fig. 4 includes some improvements on the design shown in Fig. 5. Details of the diagram are: A—String ties. B—Stake 8ft. long. C—Spacer to allow clearance for lid. D—½in. diameter rubber hose. E—Baking powder tin. F—Lid.

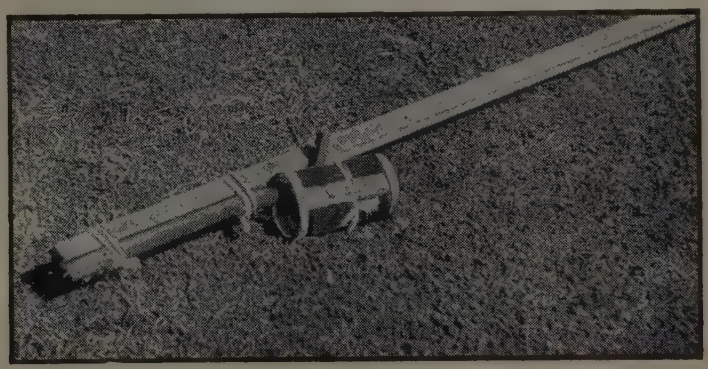


Fig. 3—Chemical powder being blown into a wasp nest in a bank. To load the tube with the powder it is looped and the powder dropped into the end opposite that inserted into the mouth.

Fig. 6—Method of directing B.H.C. smoke with applicator gun into the basement of a house to destroy a nest which is otherwise inaccessible.

Fig. 7—Discharge of "Fumite" size 4 smoke generator from improvised applicator.

nest can be quickly and effectively dealt with.

When within reach of the nest prepare the generator for lighting, place it in the tin, ignite it, and close the tin quickly and securely. Smoke will then billow from the tube (Fig. 7) and should be directed over and around the nest. The tin holder gets very hot during the few minutes when the smoke generator is working. When a kill has been completed (12 to 24 hours after treatment) the nest should be removed and burnt.

Nests in Walls of Buildings

Nests in walls of buildings can be treated with either D.D.T. or D.D.T.-B.H.C.

D.D.T. method: Where it is possible to locate the exact position of the nest a hole can be drilled through the weatherboarding above the nest and a liberal quantity of D.D.T. powder introduced through it by the same method as described for the D.D.T. method (2) with nests in the ground.

Smoke generator method: This is generally the most effective for destroying nests in the walls of buildings. An improvised applicator gun similar to that already described is a simple expedient for the introduction of smoke to a nest, and with this method it is not necessary to remove weatherboards.

The procedure is to drill a hole through a weatherboard as close as possible to the situation of the nest. To prevent wasps escaping, this hole should be plugged immediately the drill has been withdrawn. When the smoke generator has been ignited and placed within the applicator gun the plug should be removed from the weatherboard and the free end of the tube quickly inserted into the opening. The volume of smoke which is then applied within the confined space is usually sufficient to kill all the wasps. This method is best employed in the evening.

Nests in the Open

Nests in suitable situations in the open can be sprayed and thoroughly saturated with either petrol, diesel fuel, or kerosene where this can be done safely. It is not necessary to ignite the nests, as the fumes from these agents will make a satisfactory kill. Burning should be done only when conditions make it safe.

Show Dates

THE following are dates and venues of A. and P. shows from January to mid-April:—

NORTH ISLAND

January

1 January—Nuhaka A. and P. at Nuhaka.

*7 and 8 January—Rotorua A. and P. at Rotorua.

14 and 15 January—Wairoa County A. and P. at Wairoa.

*15 January—Marton District A. and P. at Marton.

*22 January—Central Hawkes Bay A. and P. at Waipukurau.

*25 and 26 January—Feilding I., A., and P. at Feilding.

*28 and 29 January—Horowhenua A. and P. at Levin.

29 January—North Kaipara A. and P. at Paparoa.

February

4 and 5 February—Rodney A. and P. at Warkworth.

*5 February—Rangitikei A. and P. at Taihape.

5 February—Woodville A. and P. at Woodville.

*8 and 9 February—Dannevirke District A. and P. at Dannevirke.

11 February—Dannevirke Ram Fair, at Dannevirke.

11 and 12 February—Taumarunui and District A. and P. at Taumarunui.

11 and 12 February—Taranaki A. and P. at New Plymouth.

*12 February—Pahiatua A. and P. at Pahiatua.

12 February—Hukerenui A. and P. at Hukerenui.

12 February—Waitemata A. and P. at Waiwera.

16 February—Te Awamutu A., P., and H. at Te Awamutu.

18 and 19 February—Ohura A., P., H., and I. at Nihoniho.

18 and 19 February—Masterton A. and P. at Masterton.

*18 and 19 February—Franklin A. and P. at Pukekohe.

19 February—Northern Wairoa A. and P. at Mititai.

19 February—Waiapu P. and I. at Ruatoria.

19 February—Te Puke A. and P. at Te Puke.

19 February—Waiapu P. and I. at Ruatoria.

19 February—Tauranga A. and P. at Tauranga.

22 February—Otorohanga A. and P. at Otorohanga.

24 February—Matamata A. and P. at Matamata.

25 and 26 February—Wellington and Hutt Valley A. and P. at Upper Hutt.

25 and 26 February—Te Kuiti and District A. and P. at Te Kuiti.

*26 February—Putaruru District A. and P. at Putaruru.

26 February—Waimarino A., P., H., and I. at Raetihi.

26 February—Whakatane A. and P. at Whakatane.

March

2 March—Morrinsville A. and P. at Morrinsville.

5 March—Albany A. and P. at Albany.

5 March—Waiotira Junction A. and P. at Waiotira.

*5 March—Mangonui County A. and P. at Kaitaia.

5 March—Waikato Central A. and P. at Cambridge.

5 March—Opotiki A. and P. at Opotiki.

*12 March—Whangaroa A. and P. at Kaeo.

12 March—Hawkes Bay A. and P. at Hastings.

12 March—Kumeu District A. and H. at Kumeu.

19 March—Wellsford A. and P. at Wellsford.

SOUTH ISLAND

January

8 January—Blueskin A. and P. at Waitati.

15 January—Waikouaiti A. and P. at Waikouaiti.

22 January—Palmerston and Waihemo A. and P. at Palmerston.

*22 January—Peninsula A. and P. at Duvauchelle.

29 January—Waiau A. and P. at Tuatapere.

February

*4 and 5 February—Otago A. and P. at Dunedin.

5 February—Golden Bay A. and P. at Takaka.

19 February—Murchison A. and P. at Murchison.

19 February—Banks Peninsula A. and P. at Little River.

26 February—Kaikoura A. and P. at Kaikoura.

*26 February—Maniatoto A. and P. at Ranfurly.

March

4 and 5 March—Buller A. and P. at Westport.

*5 March—Temuka and Geraldine A. and P. at Winchester.

5 March—Amuri A. and P. at Rotherham.

*12 March—Mt. Benger A. and P. at Roxburgh.

12 March—Cheviot A. and P. at Cheviot.

*19 March—Upper Clutha A. and P. at Wanaka.

19 March—Mayfield A. and P. at Mayfield.

26 March—Hawarden A. and P. at Hawarden.

26 March—Methven A. and P. at Methven.

April

*2 April—Oxford A. and P. at Oxford.

11 April—Mackenzie County A. and P. at Fairlie.

11 April—Strath-Taieri A. and P. at Middlemarch.

* The Department of Agriculture exhibit will be staged at this show.

World's Poultry Congress at Edinburgh

THE World's Poultry Congress, held every 3 years, is an event of importance and great interest to scientists and producers associated with poultry production throughout the world. In this article F. C. Bobby, Superintendent, Poultry Industry, Department of Agriculture, Wellington, who has recently visited the United Kingdom, describes the 1954 congress at Edinburgh, Scotland.

THE body responsible for promoting the congress is the World's Poultry Science Association, which is essentially concerned with the science and practice of poultry husbandry and marketing.

The first congress was held at The Hague in 1921, since when others have been held in England, United States of America, Italy, France, Denmark, and Canada, among others. For the tenth congress, held in August, more than 1750 delegates and members from 57 different countries were registered, this being the second largest attendance since the congresses were started. Among countries represented were the U.S.A., Canada, South Africa, Australia, New Zealand, France, Germany, Holland, Denmark, and U.S.S.R., in addition to many members from England, Scotland, Wales, and Ireland.

The organisation and administration for the congress were carried out by officers of the Scottish Ministry of Agriculture, to whom great credit is due for the excellent and efficient manner in which the work was done. Visitors would remember with gratitude the generous hospitality offered by many people associated with the poultry industry in Scotland.

Before the congress opened arrangements were made for members to go on motor-coach tours to see something of the poultry industry of Scotland, as well as places of scenic and historical importance. Two tours were organised—one of 7 days and the other of 3 days. A number of poultry farms, egg packing stations, and chick hatcheries were visited. Members visited some of the leading pedigree poultry breeders, where excellent stock was seen, including White Leghorns, Rhode Island Reds, and Light Sussex. These appeared to be the most popular pure breeds, but it was also evident that much crossbreeding is also carried out to supply laying stock for commercial egg producers. A number of breeders still depend on kerosene oil brooders for the rearing of chicks, even though electric power is now available in most districts. Breeders explained that a number of breakdowns occur during winter and spring storms, thereby rendering electric brooders of doubtful value. Breeding farms were mainly laid out in small units on the semi-intensive system, involving a labour bill which it would be most difficult to face in New Zealand. On these pedigree poultry farms progeny testing of breeding stock is being carried out and pedigree pullets trapnested. All breeding farms visited were accredited under the Poultry Stock Improvement Plan.

The author (at back) with a German delegate (left) and a Danish delegate and his wife (right) during a stop on a pre-congress bus tour.

The egg packing stations were similar in layout and equipment to egg floors in New Zealand. There is, however, a significant difference between the two countries in the procedure of candling eggs. In Scotland, as in England, it is obligatory that all eggs should be candled by hand in front of a candling lamp; that is, single candling. Mass candling is not seen in packing stations in the United Kingdom. The class of egg reaching packing stations appeared to be satisfactory. Eggs were clean and the interior quality, as revealed before the candling lamp, was good. In general the eggs seen by congress members in Scotland were in appearance and before the candling lamps of rather higher quality than the general run of eggs on many egg floors in New Zealand. The shorter distance eggs have to travel to packing stations and the heavy deduction made for dirty eggs may well account for the good quality of eggs seen. In addition the detrimental effect of high summer temperatures was not a factor influencing the quality of eggs in August.

The pre-congress tours afforded members an opportunity to exchange views on poultry problems and at the same time see a cross-section of the poultry industry in Scotland.

The congress was opened on Saturday morning 14 August by Princess Alice, Countess of Athlone, in the McEwan Hall, an impressive and beautiful building capable of seating 3000 to 4000 people. The official languages were English and French and Princess Alice gave her opening speech in both languages; the only occasion when official interpreters were not required. In the afternoon of the same day the poultry exhibition staged in Waverley Market was also opened. The Poultry Exhibition, which is a normal feature of a World's Poultry Congress, consists of trade exhibits by leading poultry equipment manufacturers, a show of the various breeds of poultry, and educational exhibits of poultry husbandry and marketing staged by Government departments of the country in which the congress is held. Such an exhibition supplies much information regarding the latest designs of poultry equipment (incubators, brooders, laying batteries, etc.) and poultry husbandry practices. Special features were connected with the marketing of eggs and table birds. To popularise table poultry demonstrations in the preparation and cooking of poultry were given daily, the exhibition being open to the public throughout the week of the congress. Unfortunately the Poultry Exhibition in 1954 was not as large and comprehensive as has been seen at some previous congresses, the reason being that Edinburgh has no building of sufficient size to stage such an exhibition in the centre of the city.

On Monday 16 August a plenary session of the congress was held in the McEwan Hall, when three world authorities on poultry genetics, poultry feeding, and poultry diseases delivered papers to all members. On subsequent mornings a series of papers was read simultaneously in four or five lecture rooms of the university buildings, a decision as to which paper reading to attend being left to individual members. Before the congress members were issued with two books, one a verbatim collection of all the papers and the other summaries of all papers. Thus members could consult these books and decide which paper read-

Conference members on a pre-congress tour receive hospitality at the MacDuff-Duncan Hatchery. The hatchery contained 18 incubators, each of 23,000 egg capacity or 414,000 total egg capacity.

ings to attend. In general these papers were grouped under the headings of diseases, genetics, nutrition, economics, and general husbandry.

During afternoons members were invited to such functions as a civic garden party at Lauriston Castle or were given an opportunity to visit the poultry research centre or the veterinary laboratories of the Ministry of Agriculture at Lasswade.

The papers covered a wide range of subjects and were given by leading scientists from all over the world. Many papers described the results of research work carried out at research institutions and colleges, including much work done in the United States of America, Canada, and the United Kingdom. No papers received more attention from members than those devoted to the control of poultry diseases, indicating the importance of disease control in the economics of poultry production. Perhaps the largest attendances were seen where papers were read on recent work on avian leucosis (fowl paralysis, big liver disease, etc.). Though diseases such as fowl pest and respiratory infections have caused spectacular losses from time to time in many countries, it was evident that avian leucosis is causing a steady and serious drain on poultry flocks throughout the world. The great interest shown in this disease is caused primarily by the fact that no country has yet found a satisfactory practical method of control. Though much work on the disease has been done in a number of countries, little advance toward a solution to this important problem has yet been made. This proved to be a great disappointment to members of the congress.

Considerable interest was shown in the paper dealing with random sample tests for laying pullets. This new type of test—first tried in Holland and since established in the United States of America—is arousing interest in most poultry producing countries. As established in the U.S.A. these trials involve considerable capital expenditure and appear to be essentially for the benefit of poultry breeders who have been progeny testing over a number of years. These trials are designed to test or compare the genetical value of strains of birds in terms of production freed as far as is possible from the influence of environment and management. This type of trial could well serve also as a testing ground for the resistance or susceptibility of strains of birds to avian leucosis.

A general meeting of members of the World's Poultry Science Association decided to invite the Government of Belgium to hold the Eleventh World's Poultry Congress in 1957 in Brussels. The meeting elected as president for the next 3 years Dr. R. F. Coles of the Ministry of Agriculture, England.

The closing ceremony of the congress was held in the McEwan Hall. It was an impressive gathering with a world-wide representation, which left no doubts as to the importance of poultry products in the diets of peoples of many countries.

Meteorological Records for October

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in Inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	55.4	— 1.4	70.9	36.7	2.72	16	— 1.79	0.54	25	169.8
Auckland	160	57.4	+ 0.0	70.1	42.9	2.25	9	— 1.84	0.75	13	210.6
Tauranga	10	53.9	— 2.1	71.2	34.4	1.42	7	— 3.55	0.55	21	267.7
Ruakura	131	52.6	— 1.7	70.2	31.9	1.18	7	— 2.95	0.41	13	236.1
Rotorua	975	52.3	— 0.5	71.2	32.3	1.66	7	— 3.50	0.67	21	230.0
Gisborne	12	53.3	— 2.2	73.0	32.4	1.41	9	— 1.02	0.53	21	245.8
New Plymouth ..	160	53.2	— 1.2	67.5	36.0	2.16	7	— 3.47	1.20	13	252.0
Kariol	2125	47.7	— 0.5	70.0	26.0	2.25	10	— 2.00	0.75	13	
Napier	5	55.0	— 1.5	73.5	33.8	1.08	4	— 0.82	0.89	21	261.9
Wanganui	72	54.2	— 0.6	68.9	35.1	2.29	6	— 0.93	1.34	13	249.4
Palmerston North .	110	52.8	— 1.1	69.7	30.7	1.87	11	— 1.69	0.84	13	236.3
Waingawa	340	51.4	— 1.3	75.8	27.0	1.74	11	— 1.22	0.45	13	257.1
Wellington	415	52.1	— 0.7	67.0	36.0	2.01	10	— 2.22	1.10	13	217.5
Nelson airfield ..	5	50.7	— 1.5	68.0	31.3	0.56	3	— 2.78	0.26	21	243.4
Blenheim	12	53.6	— 0.1	80.5	32.5	0.42	5	— 1.78	0.11	13	277.8
Hokitika	15	50.5	— 0.5	62.0	34.4	5.16	17	— 5.86	1.27	8	154.1
Hanmer	1270	50.2	— 0.4	75.0	26.0	1.62	8	— 2.28	0.41	23	213.1
Christchurch ..	22	54.0	+ 0.9	80.4	27.7	0.35	4	— 1.60	0.23	23	231.8
Ashburton	323	54.2	+ 1.8	82.6	26.6	0.70	6	— 1.72	0.28	23	237.5
Timaru	56	53.0	+ 0.3	83.5	29.8	0.71	6	— 1.22	0.37	23	236.0
Alexandra	520	53.0	+ 0.6	76.9	30.6	0.47	6	— 0.75	0.33	23	229.7
Taieri	80	51.2	+ 0.1	76.9	26.7	1.12	12	— 0.94	0.28	12	180.6
Invercargill airfield	0	49.6	+ 0.6	72.2	28.0	3.22	18	— 0.26	0.46	13	157.9

Fattening Rations for Pigs

WITH the return to free marketing of all meat products the consumer is showing continued preference for quality, and if pig meats are to compete successfully with beef, mutton, and lamb, the producer must endeavour to market animals of the required standard. Improvement through breeding is necessarily slow, but through feeding something can be done immediately. In this article, E. D. Edwards, Technical Officer, Department of Agriculture, Wellington, discusses the selection and use of various foodstuffs and the management necessary to produce first-class carcasses.

IN considering fattening rations for pigs it is necessary to recognise that the type of pig used and the method of feeding during the early period of growth have much bearing on the management that should be adopted over the later stage of fattening.

There are in New Zealand both pork and bacon type breeds of pigs. Pigs of the former type mature more quickly and hence give a properly finished carcass at much lighter weights than do pigs of the latter type. Dependence on fluctuating supplies of dairy by-products requires that in general first litters should be marketed as bacon and second litters as pork. To achieve this an intermediate type pig is bred from parents representing both the above breed types, and though good porkers can be produced in this manner, baconers tend to be too short and overfat unless slaughtered as light baconers. On farms where some selection is possible at porker weights only the lengthier pigs should be sorted out to be taken on to baconer weights.

Capitalising on Growth Characteristics

To produce economically carcasses having the desired proportions of meat and fat the foundation of meat must be truly laid. Advantage should be taken of the inherent capacity of the pig for rapid growth during its early life by encouraging it to eat flesh-forming foods which are well provided with minerals and vitamins and are not too bulky or fibrous. This will ensure the proper development of muscle before the pig reaches maturity, when there is a strong tendency to lay down fat. At this latter stage it is then possible to restrict the ration to prevent the deposition of too much fat.

Essential Food Ingredients

A well-balanced diet contains sufficient protein, energy producing materials, minerals, vitamins, and water to promote normal healthy growth.

[*B. Snowden*

Properly finished carcasses of this type meet a keen demand in the trade. The adoption of sound feeding methods can have an immediate effect on carcass quality improvement.

Proteins: Under New Zealand conditions pigs fed on skimmed milk receive protein in excess of requirements, but the excess is used for energy and conversion to fat without harmful results. The protein contained in whey is of high quality, but is present in relatively small amounts, and to take care of this deficiency it is recommended that whey-fed pigs should receive ½lb. of meat meal per day. In any case both whey and skimmed milk are bulky and better results are obtained by supplementing with meal, at least up to porker weights.

The best sources of high-quality protein for pigs are skimmed milk, buttermilk, whey, and milk powders. The next best are meat meal, meat scraps, and fish meal. Vegetable proteins on the whole are of lower biological value.

Energy producing materials: Most foods contain energy producing or fattening constituents. Fat or tallow is the most concentrated of these. One pound of fat liberates in the body as much heat or energy as 2 to 2½lb. of either protein or "sugar" (carbohydrate). Thus on a weight basis fat is worth at least twice the price of meal or grain, but excess of fat is harmful and wasteful. It clogs the digestive system and much is excreted in the manure.

The carbohydrates are also energy producing materials. Foods richest in carbohydrates are barley, wheat, oats, maize, pollard, molasses, potatoes, sugar beet, and most commercial pig meals. One form of carbohydrate, fibre, is not well digested by pigs and must be fed in limited amounts. Foods high in fibre are stalky pasture, bran, and husky varieties of oats. Under New Zealand feeding conditions, where the basic rations are fibre free, foods with high digestible fibre content are not as undesirable as where these would form the bulk of the ration.

Minerals: Growing stock require minerals mainly for bone formation. Under New Zealand conditions deficiencies are not common, though on certain diets some precautions are desirable. Calcium and phosphorus exist in the body largely in combination and are required in certain pro-

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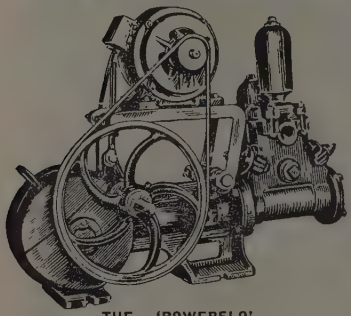

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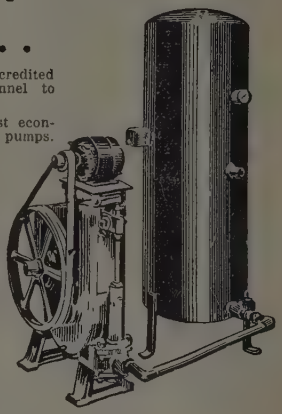

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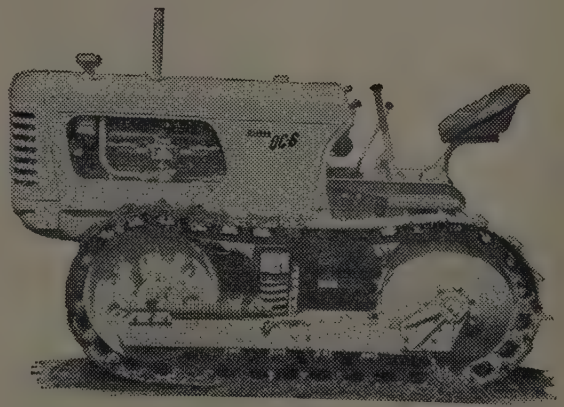

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Pigs at trough, showing variation in type. The earlier maturing types should be marketed as 70lb. to 80lb. porkers and, as far as food supplies permit, the longer, bacon type pigs taken on to 140lb. to 160lb. carcass weight.

portions. Actually both skimmed milk and whey carry a slight excess of phosphorus and therefore the practice of using a handful of lime in the milk or whey containers can be recommended.

When cereals or other foods of vegetable origin, other than green foods, form a large part of the diet it will be deficient in calcium, phosphorus, and common salt. A mixture containing these minerals should be included in these circumstances at the 2 to 3 per cent. level.

A deficiency of iron is likely to occur in pigs farrowed and reared indoors, but access to grazing or earth should remove this danger. Copper is sometimes deficient in association with iron and for this reason a mixture of copper sulphate and iron sulphate is used extensively in the prevention and cure of iron anaemia in suckers.

Vitamins: Pigs fed on dairy by-products, with access occasionally to good-quality green feed and exposure to sunlight, will secure in their feed all the materials necessary to enable them to synthesise the vitamins which are not fully elaborated in the food.

A deficiency of vitamin A reduces resistance to disease, especially

TABLE I—EQUIVALENT FOOD VALUES

Foodstuff	Lb. per food unit		
Foods Deficient in Protein			
Concentrates			
Whey (when fed balanced with meat meal 1lb. to 5 to 10 gals. according to liveweight of pig)	15	(1½ gals.)	When balanced with meat meal may be fed with roots or other protein deficient foods
Maize, barley, wheat	1		
Pollard or oats	1¼		Feed as supplements to skimmed milk or buttermilk; or with meat meal to supplement whey or roots
Bran	1¾		
Molasses	1½		
Tallow	⅛		
Bulky Foods			
Pumpkins, swedes, or mangolds	10		Feed with meat meal or with skimmed milk or buttermilk; or with meat meal to supplement whey
Carrots	8		
Fodder beet	7		
Artichokes	6		
Sugar beet	5		
Potatoes (boiled)	5		
Foods Rich in Protein			
Concentrates			
Skimmed milk or buttermilk	10	(1 gal.)	Feed with roots or other protein deficient foods
Mother liquor	2⅔	(¼ gal.)	
Pea meal	1		
Linseed meal	1		
Meat meal (60 per cent. protein)	1		

(Milk powders, 3/4lb. per food unit, would normally be too expensive for use with fattening stock when meat meal is available. They should be fed dry and mixed with grain meal rather than as a bulky food by being mixed with water.)

Bulky foods			
Grass, lucerne, rape, kale, chou moellier	10		Supplement with concentrated foods

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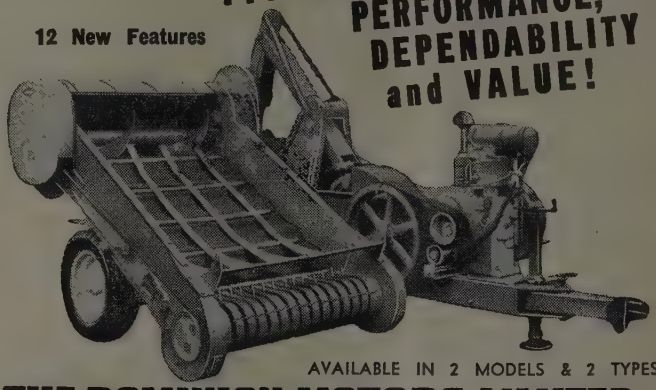

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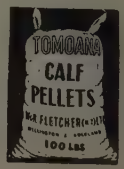

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respiratory troubles. As pigs are naturally susceptible to pleurisy and pneumonia, this aspect of diet and housing conditions needs close attention.

It is possible that pigs confined to their house and fed wholly on dairy by-products may suffer from a type of vitamin A deficiency—a stiffness or paralysis of the hindquarters.

Water: This is essential for life and though the chief pig foods in New Zealand contain large amounts of water, it is wise to have clean drinking water available for the animals to satisfy their own requirements.

Values of Common Pig Foods

The meal unit or food unit system offers a means of comparing the feeding value of various foods and is useful as a guide in pig feeding. Under this system a feeding stuff is said to have a value of 1 meal unit if it has the same approximate fattening value as 1lb. of barley meal. The system does not take into account such factors as protein content, palatability, or bulkiness.

In Table 1 food values of common pig foods are given, arranged according to protein content and bulkiness and according to methods of supplementing.

Protein Requirements of Fattening Pigs

The quantities of **each** one of the following foods which will supply **all** the protein required is shown below. (In practice the other constituents of the ration used will contain a certain amount of protein and smaller amounts than those shown will suffice, depending on what the other ingredients of the ration are.)

Size of animal	Skimmed milk	Meat meal	Pea meal
	gals.	lb.	lb.
Weaner	1	½	1⅝
Baconer	2	1	3½

Food Requirements of Fattening Pigs

D. M. Smith, Research Officer, Department of Agriculture Ruakura Animal Research Station, has worked out a ration suitable for pigs on a typical skimmed milk and meal diet. This ration (of which Table 2 is a simplified version) is one which an average pig is capable of consuming fairly easily and supports a liveweight growth of 1lb. or more per day.

TABLE 2—FOOD UNITS REQUIRED TO PRODUCE A LIVEWEIGHT GROWTH OF 1LB. OR MORE PER DAY

Liveweight	Food units per day	Liveweight	Food units per day
lb.		lb.	
40 ..	2.0	*140 ..	4.5
60 ..	2.5	*160 ..	5.0
80 ..	3.0	*180 ..	5.5
100 ..	3.5	*200 ..	6 0
*120 ..	4.0		

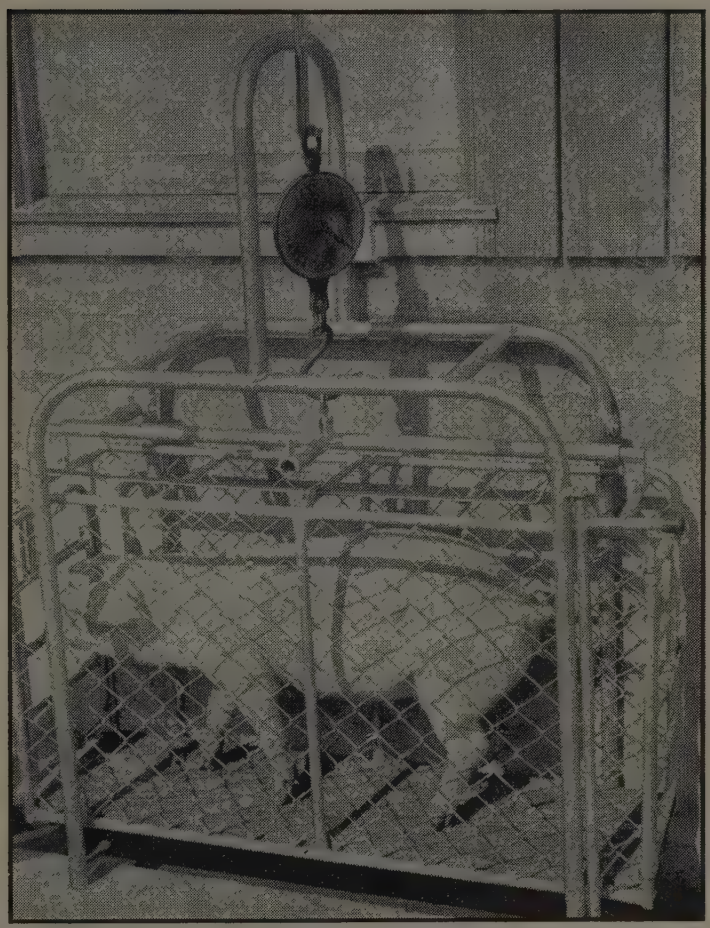
* See Table 3.

This is about the upper limit if milk only is fed and scouring is to be avoided with four times a day feeding. More rapid growth can be achieved by feeding meal (plus milk to appetite) at a rate which increases gradually to 1½lb. at between 50 and 70lb. liveweight and then tapers off, meal feeding ceasing at about 100lb. liveweight.

Where the supply of dairy by-product is inadequate to provide for rapid growth the use of meal may be of considerable value, such as for:—

1. Finishing off summer litters as porkers. Supplementing with roots may be even more economic. If the first two food units consist of meal and dairy by-product, the provision of good-quality roots such as fodder beet to appetite will allow a satisfactory rate of growth to be maintained.

2. Feeding to small pigs in early spring to help pigs to grow to a size at which they are capable of consuming the flush of dairy by-product as the season advances.



Fattening pigs should be weighed regularly to check progress and to ensure marketing within desirable weight ranges.

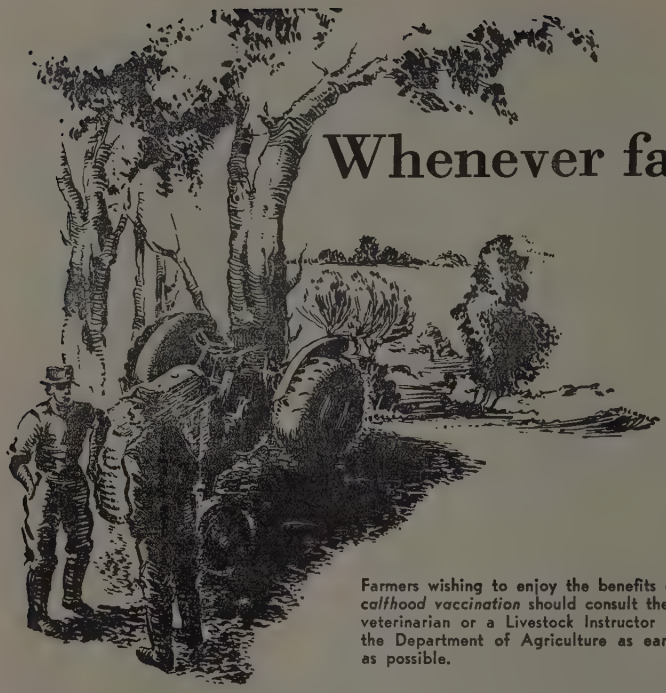
Twice a Day Feeding

Ruakura work indicates that when skimmed milk (rationed as in Table 3) is fed twice daily to pigs over 3 months old there is no appreciable loss in growth-rate or efficiency. This method permits the smaller pigs in the pen to get their quota without competing with larger pigs. It can also mean much saving in time and labour on farms where labour is at a premium. However, unless the milk is always fed sour, with uniform development of acidity, there is the possibility of scouring, so the farmer will have to decide whether under his conditions it will pay him to restrict the number of feeds to two per day.

Restricting Food Intake of Baconers

If pigs are taken beyond the porker stage on a full diet, there is a tendency for them to put on too much fat. This problem can be avoided to some extent by taking on to baconer weight only pigs of a late-maturing type. Where this is not possible restriction of food intake is recommended. Restriction means keeping the feed below appetite level or lowering the total energy content of the food consumed. Since pigs kept on a ration below appetite level will fight at the trough, it is desirable to incorporate in the ration a bulky food such as roots or grass to assist in satisfying appetite.

For restricted feeding to be at all effective in improving carcass quality



Whenever farmers meet ..

Sooner or later conversation turns to the subject of stock wastage. The modern farmer must run his business on sound economic lines. His success depends largely on the health of his stock, and he is quick to apply new methods of disease control. Contagious abortion can seriously affect production, but most farmers now recognize the value of vaccination in the prevention of this disease.

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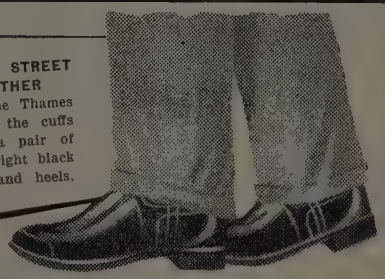

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pigs must be weighed at least every fortnight. The optimum growth-rate to aim at is a gain of between 1lb. and 1½lb. liveweight per day. An example of restricted feeding for the intermediate type pig is given in Table 3.

Trial Results

Trials conducted before the war by C. E. Ballinger at Ruakura showed that restricting the ration of pigs after they had reached 120lb. liveweight resulted in substantial food savings and a marked improvement in carcass quality compared with that of pigs fed on a full diet, though it meant holding the pigs a week or fortnight longer to reach market weight.

Influence of Diet on Fat Quality

A good-quality bacon fat of the right texture is firm and free from taint and discoloration (white). An inferior fat is soft and greasy and is objectionable to the sight, taste, and smell on being cooked.

Tainted pig meats may be the result of faulty curing and treatment before purchase by the consumer or to the type of food the pig eats. Certain foods produce soft fat and others taint or discolour the carcass. Fortunately most New Zealand pig foods produce an excellent-quality carcass. The foods which produce a firm fat include milk products, most grains, seeds and meals, and practically all crops grown for winter use.

The following foods are likely to produce a soft fat when fed in excess: Cod liver oil, whale oil, yellow maize, and linseed products high in oil. The fish oils are used mainly as sources of vitamins A and D, particularly in the rations of housed pigs.

The daily dose should be limited to 2 tablespoons for large pigs and should be discontinued a month before slaughter.

Maize, despite the fact that it gives excellent fattening results, should not form more than 20 per cent. of the ration. Linseed products are noted for their high food value and for their tonic effects. Excess of high oil content linseed by-products in the feed will produce soft fat.

Foods which taint the flesh include excess of fish oils, fish meal, low grade tallow, unripe turnips, and immature kales and rape.

Though fish meals have not been used extensively in New Zealand, there are several proprietary pig meals being sold at present which contain a proportion of fish meal, ranging between 2 and 8 per cent. The oil content of the fish meal is about 15

TABLE 3—PRACTICAL FEEDING GUIDE FOR RESTRICTED FINISHING OF INTERMEDIATE TYPE OF PIG

Liveweight	Food units daily	Daily Ration: Using fodder beet — Skimmed milk	Fodder beet*	Using mangolds (or grass) — Skimmed milk	Mangolds*
		(gals.)	(lb.)	(gals.)	(lb.)
120	4½	2½	12	3	12
140	4½	2½	16	3	15
160	4½	2	20	3	18
180	5	2	20	3	20
200	5	2	20	3	20
220	5	2	20	3	20

* If the roots are fed to appetite with the amounts of skimmed milk shown, the quantities stated will be roughly what would be consumed. If on these rations the rate of gain falls below 1lb. liveweight per day, the milk (or meal) should be increased to achieve this rate of gain; for example, pigs feeding on grass or low-dry-matter types of root crop use energy in consuming and digesting these fodders, which reduces their practical value in a fattening ration and the quantity of milk or meal may have to be increased.

Prolificacy and Performance in a Breeding Sow

THE grade Berkshire sow illustrated with her litter at right is an excellent example of the type of breeding sow that is required for profitable pig production. She is the property of Mr. A. L. Skilton of Tayforth Road, Wanganui, and at her sixth litter farrowed 17 pigs, of which she reared 10 to the exceptionally good weight of 494lb. at 56 days old, an average of nearly 49½lb. The sire of the litter was a Large White boar.

THIS result was achieved without any special attention or equipment. The sow farrowed in a wooden house 8ft. x 8ft. with farrowing rails but with no other amenities such as brooders or artificial heat. If an infra-red brooder had been available and if it had been possible to attend the sow when she was farrowing, a larger number of pigs would probably have been reared. Before farrowing the sow had virtually free range on good pasture and was given 6 gallons of whey and 1lb. of meat meal per day in two feeds.

After the sow had farrowed her rations were increased until she was getting 18 gallons of whey per day plus 4lb. of broken ice cream cones and 2lb. of meat meal. No creep was available for the piglets, but at 10 days old they began to eat out of the sow's trough and were then given a separate trough in which they were fed 4 times daily a mixture of whey, broken cones, and meat meal similar to that of the sow. At weaning the amount fed had reached 8 gallons per feed, or just over 3 gallons per piglet per day. The sow and litter did not have access to grazing after farrowing, but were given as much fresh lawn clippings as they would eat daily.

This litter is the sow's sixth and her record is as follows:—

Litter	No. of pigs farrowed	No. of pigs reared
1	9	9
2	9	8
3	9	8
4	15	12
5	10	8
6	17	10

The over-all performance of this sow is remarkably good, with an average of just over 11 pigs born and 9 reared per litter. It is a result such as this based on performance over a number of litters which proves the quality of a sow. This sow illustrates clearly the prolificacy and mothering ability that should be looked for in the strain when young sows are selected for breeding stock. Records of performance kept by breeders are the answer to the questions of prospective purchasers.

—I. H. OWTRAM, Extension Officer in Pig Husbandry, Department of Agriculture, Wellington

per cent., which is sufficiently high to produce taint in carcasses when fed to fattening pigs right up to slaughter.

It is recommended that where pig meals containing fish meal are fed to fattening pigs they should not be included in the rations within 6 weeks of slaughter.

Similar precautions are necessary with feeding of garbage from fish shops and restaurants.

Inferior tallow besides causing digestive upsets is a cause of tainted pig meat. Tallow should be kept in suitable containers and stored in a dark, cool place. When exposed to blazing hot sun it undergoes oxidation and rancidity develops.

Underfeeding

Underfeeding is also a common cause of soft fat. The fat that is formed when the pig is about 2 months old is soft, but when the pig reaches approximately 100lb. liveweight and begins to lay down fat much more rapidly this fat is much firmer. If pigs between 100lb. and 200lb. liveweight are fed at a very low level, the backfat will consist largely of that formed earlier and will be soft. There is a danger therefore in restricting the food intake of baconers too severely. As recommended in the footnote to Table 3 the rate of liveweight growth should not be allowed to fall below 1lb. per day.

Main Points

Farmers should strive to produce top-quality carcasses. By the sale of short, chunky pigs at light porker weights and retention of the more lengthy pigs for baconer production the problem is partially solved. Attention must then be given to the selection of foods and the manner in which they should be used.

The merits and deficiencies of common pig foods have been discussed and a table of their values is included. From this it will be clear that without exception the daily ration of the fattening pig should consist of a mixture of foodstuffs rather than of one food, as the former will maintain health, satisfy appetite, and promote growth in the most economical way.

From a knowledge of food values and food requirements of pigs it should be possible to obtain maximum value from available foods after consideration is given to the cost per food unit of supplements.

It is recommended that all pigs should be fed at a high level of nutrition up to porker weights. Thereafter, beginning at 120lb. liveweight, the ration should be restricted to improve carcass quality and efficiency of feed conversion.

A number of foods if fed to pigs in excessive quantities have a detrimental effect on the carcass and the cured product. If no alternative food can be obtained. care is needed to ensure that these are not fed above recommended levels.

For further information on the feeding of fattening pigs, reference may be made to the following Department of Agriculture bulletins: No. 343 "Crops for Wintering Pigs" and No. 366 "Production of Quality Pig Carcasses".

Pasture Establishment on Peaty Land

IT is generally recognised that the establishment period is a crucial one in the life of a pasture. The illustrations show the effects of different methods of pasture establishment on adjoining paddocks on some peaty land near Ashburton, and show the desirability of sowing in autumn without a cover crop. This land becomes powdery and dry on the surface and contains a large amount of the seeds of weeds which under some conditions compete with the pasture species.

The illustration above shows a 2-year-old pasture which was sown in autumn without a cover crop. The result is a well grazed pasture of ryegrass and white clover. The illustration below shows a neighbouring 2-year-old pasture which was sown in spring with a cover crop of rape. The pasture is dominated by Yorkshire fog, rushes, and Californian thistles. In the early stages of establishment the pasture suffered from the competition of annual weeds and from the overgrazing associated with the feeding off of the cover crop.

—R. INCH,
Fields Instructor,
Department of Agriculture,
Nelson

Grass Staggers in Beef and Dairy Cows

GRASS staggers is a disease of cattle associated with an abnormal fall in the magnesium content of the blood. Very little is known about the function of this mineral in the animal body and even less information is available on the mechanism responsible for controlling its level in the bloodstream. Because of the economic importance of the disease and the practical interest of farmers in it J. C. Gerring, Animal Research Extension Officer, Department of Agriculture Animal Research Station, Ruakura, gave a paper on it to this year's Ruakura Farmers' Conference. In the following adaptation of his address what is known about the disease is reviewed and some practical recommendations made to control its incidence.

FIRST, it must be emphasised that there is no evidence that a low blood magnesium is due to a deficiency of this mineral in the diet. I. J. Cunningham, Superintendent of the Department of Agriculture Wallaceville Animal Research Station, determined the magnesium content of pasture, hay, and silage from areas where grass staggers frequently occurred. He also examined the bones and organs from affected animals. In his report in 1936 on this work he showed quite conclusively that a dietary deficiency of magnesium was not the cause of the disease.

A number of different workers in Britain have made similar investigations and have arrived at the same conclusion.

As recently as 1953 veterinary workers in Belgium reported the results of investigations they had made, in which they compared the magnesium content of the feeds and the amount of exchangeable magnesium in the soil of ten farms, five of which had cases of grass staggers every year and five on which the disease had never occurred. There was no noticeable difference in the feed or soil magnesium levels between the two groups of farms. The magnesium content of grass is normally so much above the known mineral requirement that it is difficult to believe that a dietary deficiency of magnesium can occur in grazing animals.

Broadly, grass staggers may occur in a simple, uncomplicated form in which the blood magnesium only is affected. It may also develop in association with, or as a complication of, either milk fever or acidosis or both. Milk fever is brought about by a fall in the calcium content of the blood, and acidosis, as it is known in this country, occurs in animals drawing excessively on their body reserves, and is associated with an abnormal accumulation of certain poisonous acids in the bloodstream.

In its simplest form uncomplicated grass staggers, or grass tetany as it is often called, is sudden in onset. Affected cattle are often found dead. In some cases symptoms of intense nervousness or excitement may be noticed and these are frequently followed by violent convulsions and death. This form of the disease is common in beef breeding cows. Even steers are occasionally affected.

Though this simple form of the disease is seen in dairy cows, the complicated forms of grass staggers occur much more commonly in this district. In these cases a low blood magnesium is associated either with a low blood calcium or with a mild to moderate degree of acidosis. Occasionally all three abnormalities may be found in the one animal at the same time. Cases which occur within a few days after calving are usually complicated with milk fever, and affected cows may show symptoms which are indistinguishable from typical milk fever. Usually, however, symptoms of nervous irritability are also present as indicated by staring eyes and excessive twitching of the eyelids when the animal is approached.

On the other hand, cases which occur more than 5 to 6 days up to several weeks after calving are often complicated with acidosis. Many of these animals are still on their feet when first seen. Nervousness and excitement are again the most prominent symptoms and affected cows often show a typical high-stepping or hackneyed gait. Any sudden fright or exertion may precipitate a convulsion or fit.

The economic importance of these complicated grass staggers cases is due to the fact that treatment is often accompanied by disappointing results, there being a high percentage of deaths, and animals that do respond usually take several weeks to do so, so that a serious loss in production occurs.

Disease is Seasonal

In the Waikato grass staggers is a seasonal disease, the majority of cases occurring during July, August, and September. This occurrence coincides with the seasonal fall in blood magnesium found by White from his investigations at Ruakura.

However, the most characteristic feature of grass staggers is the increased incidence which occurs in adverse or unfavourable seasons. This is shown by contrasting the last two calving seasons, 1952 and 1953. In 1952 comparatively mild, open weather during late winter was followed by an early spring. In 1953 a favourable autumn resulted in most cows entering the winter in good condition, but adverse weather was experienced during July and August and spring growth was at least 3 to 4 weeks later than usual. Figures from the case books of veterinary surgeons in club practice in different parts of the Waikato, all of them with several years' experience in this district, contrast the number of typical uncomplicated milk fever cases and complicated grass staggers cases for the 1952 and 1953 seasons respectively. In 1952, 12 per cent. of all cases of metabolic diseases visited were diagnosed as grass staggers. In 1953 this incidence more than doubled to over 24 per cent. of all cases.

In the March issue of "The New Zealand Veterinary Journal" the results of a survey on the over-all incidence of these diseases during the 1953 season were published by Smith of the Huntly District Veterinary Club. In this survey, which was based on information supplied by farmers, 33.6 per cent. of all cases and just under 3 per cent. of all cows were affected with metabolic diseases other than typical milk fever.

Some farmers consistently experience a high incidence and others never have a case. Thus, in the survey just referred to 5 per cent. of farms had more than 10 per cent. of their cows affected. Two farms had an incidence of over 30 per cent. In contrast, over 20 per cent. of farms had no cases of staggers or milk fever.

Effect of Under-feeding

One of White's most interesting findings in his work at Ruakura is that the uncontrolled grazed cows consistently showed a significantly lower blood magnesium in 3 of the 4 years of his investigations than the controlled grazed group. These results provide some factual evidence to explain why the incidence of this trouble increases considerably in unfavourable seasons and why the incidence varies from farm to farm. In other words, under-feeding by lowering the blood magnesium increases the susceptibility of cows to the development of grass staggers. Swan at Wallaceville succeeded in inducing grass staggers by deliberately underfeeding.

This association between underfeeding and an increased susceptibility to grass staggers has long been recognised by field veterinarians. As long ago as 1943 Blakely, who was then the senior veterinary surgeon of the Morrinsville District Veterinary Club, presented a paper to the New Zealand Veterinary Association on grass staggers. In this address he stated: "The difference in incidence from herd to herd varies as do feed conditions". He found the incidence of grass staggers to be greatest "when a mild autumn was followed by a severe winter and a late spring". In a short article in the June 1948 "Journal of Agriculture" the writer contrasted the high incidence of grass staggers in the adverse calving season of 1945 with the lower incidence in the more favourable 1947 season, and concluded that making provision for the adverse season was the best assurance against these losses.

Swan and Jamieson, Wallaceville Animal Research Station, working in co-operation with field veterinarians, carried out an intensive investigation into the occurrence and cause of grass staggers during the 1945, 1946, and 1947 seasons in the Waikato. As one aspect of these investigations a detailed study was made of four herds in two of which the incidence of metabolic diseases had been nil or very low over the previous 5 or 6 years, whereas the other two herds regularly experienced from 5 to 10 per cent. incidence and

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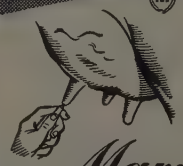

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from 2 to 4 per cent. mortality from metabolic diseases. To quote their findings:—

> The good herds were fed ample fair-quality hay, both before calving during winter and after calving well into spring, while the bad herds received about half as much hay per cow during winter and feeding ceased earlier in spring. The good herds received also daily rationed amounts of nutritious autumn-saved pasture during their first 6 to 8 weeks of lactation, while the bad herds received little or none, their pasture during the early lactation period being predominantly or entirely short, young, fresh growth.

The part played by under-feeding in increasing the animals' susceptibility to grass staggers by lowering the level of blood magnesium has been stressed. Another interesting and significant feature was brought to light a few years ago by some investigations made in this district by Cunningham. Field veterinarians collected blood samples from 6 to 12 apparently normal cows in herds where cases of grass staggers were occurring. In every instance it was found that these cows, though they showed no symptoms of the disease, had a blood magnesium well below normal, though generally not quite so low as the affected ones.

Precipitating Factors

There is a great deal of field experience and some experimental evidence to suggest that a number of factors may act to precipitate the onset of the disease if superimposed on cows already in a susceptible state through bad feeding of the type described.

The act of calving, for example, if this occurs at a time when the blood magnesium is already low, is considered to be a common precipitating factor. Normal calving is frequently followed, particularly in high-producing cows, by a fall in blood calcium, and this extra stress is sometimes responsible for a further drop in blood magnesium producing a complicated milk fever-grass staggers case. Seasonal calving, occurring for the most part during the feed critical months of July, August, and September, may be partly responsible for the relatively high incidence of grass staggers in this country.

One of the commonest factors associated with the development of this disease, and one stressed by almost every authority on the problem, is the grazing of short, protein-rich pastures, particularly on soils which are highly fertile. This is frequently seen in run cows grazing pastures which have been kept short by sheep on highly productive fat lamb farms. A sudden change to this sort of pasture from a rough grazing is particularly dangerous. Quite recently the disease was produced experimentally in Britain by turning cows directly from indoor winter feeding to an all-grass diet where the pasture was previously topdressed with 6cwt. of sulphate of ammonia per acre. Cows grazed on the same pasture but fed concentrates as a supplement showed no clinical symptoms. Similarly a further group of cows grazed on a control plot which was not topdressed with sulphate of ammonia did not develop the disease.

The Belgian workers referred to earlier, in their investigations of the ten farms five of which had cases of grass staggers every year and five in which the disease had never occurred, state that "the only striking difference was found in the protein content of the grass, much higher values being found on farms where grass staggers occurred". Unfortunately, no actual figures are given. Nevertheless it is a common experience in the field that supplementing lush pasture with good-quality hay or grazing more mature pastures will reduce the risk of grass staggers.

In the report of Swan and Jamieson, already mentioned, reference is made to the fact that "sudden cessation of feeding out of hay was found to be associated with several outbreaks, including one herd in which six cows were affected on one day. Likewise, a sudden exhaustion of supplies of mature pasture resulting in complete dependence on young, new growth was followed by the occurrence of 6 cases in a week in another herd".

Another common factor associated with a greatly increased incidence of grass staggers is a short period of cold, wet weather. Blakely refers to this and suggests also that the extra energy (therefore food) required to plough up and down muddy races may precipitate the disease. This bad effect of unnecessary exercise is only too well recognised by veterinary surgeons who have to treat so many of these cases in such unfavourable places.

Though much further investigation will be necessary before a clear understanding is obtained of the way in which the level of blood magnesium is controlled, in the light of existing experience of the conditions under which grass staggers occurs in the field it is clear that some sound recommendations can be made to minimise serious losses from this disease.

Use of Heavy Topdressings

Before this, however, brief reference must be made to recent experiments in Great Britain on the use of heavy topdressings on rapidly growing, nitrogen-stimulated pastures with calcined magnesite as a means of preventing grass staggers. This compound contains 87 per cent. of magnesium oxide and was applied at the rate of 1¼ tons per acre. At this rate it approximately doubled the magnesium content of the pasture and this increase was maintained for 2 years. With one exception cows grazed on such swards after indoor winter feeding maintained normal blood magnesium levels and did not develop staggers. Falls in blood magnesium and some clinical cases occurred in cows grazed on similar nitrogen-stimulated pastures not topdressed with the magnesium compound.

Cunningham, in 1936, using small-scale plot trials, showed that the magnesium content of pastures could be increased by the application of magnesium compounds. Epsom-salt at 8cwt. per acre produced an increase of 20 per cent. and 1 ton and 2 tons per acre resulted in increases of 40 per cent. and 60 per cent. respectively. A dressing of 7cwt. of dolomite per acre containing magnesium, equivalent in amount to that present in 8cwt. of Epsom-salt, gave a much more delayed and less persistent increase.

Calcined magnesite of the British quality does not appear to exist in New Zealand. A raw magnesite costing about £15 per ton is available in limited quantities, but would have to be burnt, which would approximately double its cost. Though the practice would appear to be ruled out on economic grounds, it is proposed to look at the possibilities at Ruakura in the near future.

Field trials were carried out in the late 1930s in this district, in which on some farms Epsom-salt was added to the drinking water, on others dolomite was included in the silage, and on still others both substances were provided in the form of licks. All these trials were conducted on farms experiencing trouble from grass

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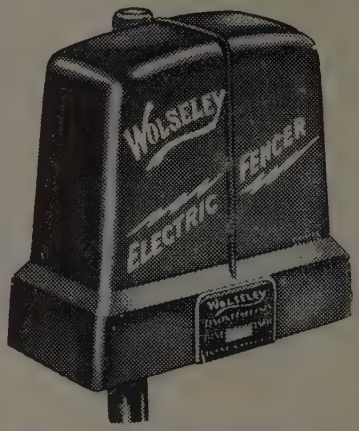

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staggers. Some beneficial results were claimed from the use of these compounds, though no untreated animals were kept as controls. The only controlled experiment of this nature in New Zealand of which the writer is aware, where the cattle were dosed directly with the magnesium compounds, gave negative results, as judged by the effect on blood magnesium. In Britain also, though positive results have been obtained in some cases, the findings have been quite inconclusive in others.

Management methods designed to even up the feed supply seem to be the most important aspect of prevention. The first essential is a realistic appreciation of the seasonal nature of pasture growth and the extent to which this is related to feed requirements. This relationship on a dairy farm is illustrated in Fig. 1. It can be seen that July, August, and September are the three most critical feed supply months. In contrast, during spring and early summer some 40 per cent. of the grass grown is surplus to requirements. Again in autmn, with the needs of the cows declining, the feed grown is from 15 to 20 per cent. in excess of that required for production. Saving this surplus growth, already inevitably produced on every dairy farm, is the first obvious means of filling the gaps in the feed supply.

Recommendations

Recommendations in reducing losses from grass staggers are:—

1. Conserve 10cwt. to 15cwt. of hay and 2½ tons of silage per cow. Use these feeds to winter the herd on a reasonably good plane of nutrition. Keep sufficient reserves to supplement pasture growth in the early part of the season.

2. Close up the 15 to 20 per cent. of surplus growth in autumn and carry this through winter for feeding after calving. Ration this feed with the electric fence to make it last until spring growth on the rest of the farm has hardened up. Supplement autumn-saved pasture with the reserves of hay and silage kept for this purpose.

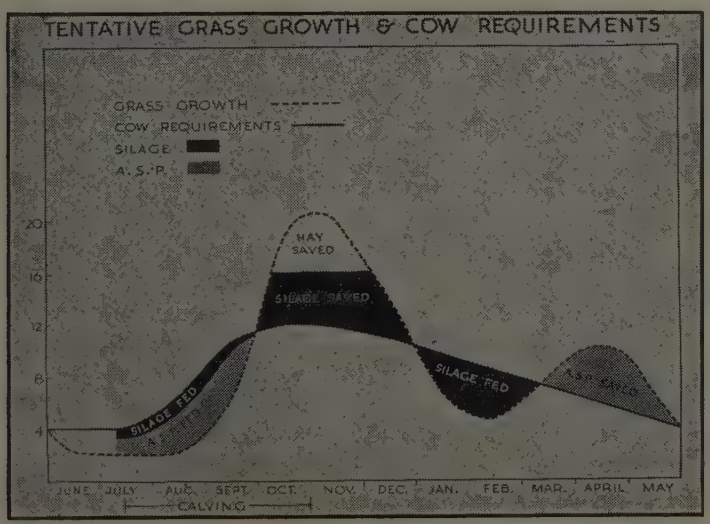

Fig. 1.

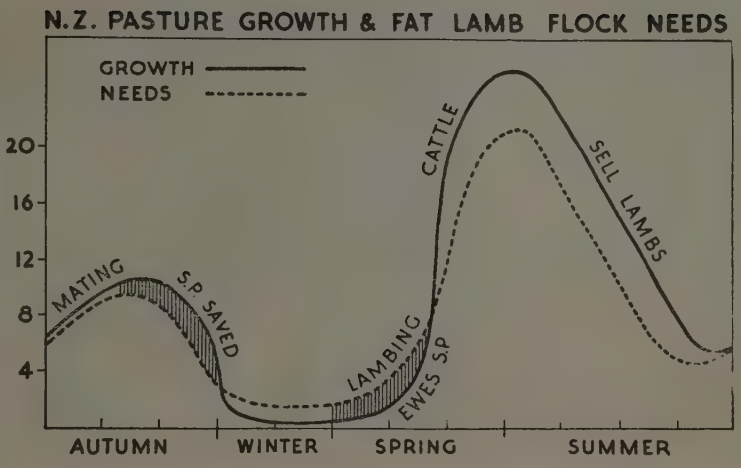

Fig. 2.

3. Subdivide the farm so that a system of controlled rotational grazing can be practised. In this way sudden changes in feed quality can be reduced. Use the electric fence for extra temporary subdivisions, during winter, to increase spelling as pasture growth declines. This will help to maintain some pasture cover on the paddocks and thereby encourage more winter growth.

4. Offset adverse weather by providing extra feed and the best sheltered paddocks available.

5. Put cows close to calving in paddocks near the shed and keep them under close observation. Early recognition of sickness and prompt veterinary attention will save many cases.

The principles in these recommendations have been applied at No. 1 Dairy at Ruakura as a means of maintaining a high level of production. A detailed examination of the individual health cards of the 722 cows which have calved on this farm over the past 7 years reveals that only 3 cows have died from metabolic diseases during this period.

Beef Cattle

As to beef cattle, Fig. 2 illustrates the relationship between pasture growth and feed requirements on the fat lamb farm. July, August, and September are again the really critical months, especially as these coincide with the lambing period. Though preventing grass staggers in beef cattle involves applying the same principles as those already described for the dairy farm, there is one very important difference. On any efficiently run fat lamb farm cattle must inevitably take second place to sheep. Though steers seldom suffer from such treatment, breeding cows, especially over the calving and early lactation period, are a much more risky proposition.

One obvious way of preventing the trouble is to avoid the use of breeding cows on fat lamb farms. Sheep eat too close for their welfare in seasons when pasture growth is slow, and as C. P. McMeekan, chairman of the conference, has provocatively suggested on many occasions in the past, their use is inefficient on fattening country.

If breeding cows must be kept for economic reasons, use the same methods in principle in avoiding trouble as those advocated on the dairy farm. In addition, it is recommended that calving should be delayed until October, when grass growth is normally adequate for newly calved cows. This will not markedly affect the calves.

To provide more facts on the occurrence of metabolic diseases generally a survey form has been drawn up jointly by the local branch of the New Zealand Veterinary Association, Waikato Federated Farmers, and the New Zealand Dairy Board. It has the full approval and financial backing of the Veterinary Services Council.

Pig Improvement Research Supported by Producers' Council

Opening of New Piggery at Massey Agricultural College

AN important further step in the New Zealand Pig Council's practical support of research directed toward pig improvement was completed recently when the Research Piggery built at Massey Agricultural College with the aid of a grant from the Council was officially opened by the Minister of Education and the Minister in charge of Scientific and Industrial Research, Mr. R. M. Algie.

THE policy adopted some time ago by the Council accepted the principle that extension work in pig husbandry to be fully effective must be associated with pig improvement, so that as management standards improved there would be suitable stock with the productive efficiency necessary to exploit fully the advantages of better piggery conditions and management.

The crossbred pigs being developed at the Department of Agriculture's Ruakura Animal Research Station attracted the attention of pig industry leaders, and 2 years ago the Pig Producers Council contributed the capital cost of the extra farrowing and rearing facilities required at Ruakura to establish a pilot breeding plant to test further the value of the hybrid approach to pig improvement and to multiply and distribute tested hybrid sows throughout the industry on a planned and controlled basis.

Testing Centre for Hybrids

The pig husbandry department of Massey College was included in the programme and the similar facilities newly established there by the Council and the College are to be used as a testing centre for the hybrids.

At Ruakura the Berkshire-Large White hybrid sows have been mated to the Large White boar and it is intended to try mating them to the Tamworth also. The resulting litters will be farrowed and reared at Massey under standard feeding conditions in an endeavour to assess the crossing ability of the Tamworth.

The aims of the project to produce a national hybrid sow and the work at Ruakura to date are described in an article by D. M. Smith, Research Officer in charge of the project at Ruakura, elsewhere in this issue.

The first batch of national hybrid sows was made available to Massey College and a few farmers this year, and some of the sows grunted an obbligato to officials' speeches at the opening ceremony at the Research Piggery at Massey.

As larger numbers of proven purebred stock become available at the Ruakura Breeding Centre the supply of sows will increase. The project is still in the experimental stage, the main task at Ruakura at present being to breed satisfactory purebreds and to test their crossing ability. The first lots of hybrid sows available must therefore be regarded as test lots and not the finished products. The further testing possible under the ideal research conditions provided at the new Research Piggery at Massey will no doubt help to speed the attainment of the goal of a national hybrid sow. An incidental, but not less important, result that is expected from the scheme is that the distribution of good commercial stock will be an ideal method of introducing farmers to improved housing and management.

The work at Ruakura and the facilities provided there by the Pig Producers Council were of great interest to farmers at this year's Ruakura Farmers' Conference and a large crowd attended the opening of the Research Piggery at Massey.

In referring to the appointment of Mr. A. C. Dunkin of Wye College as lecturer in pig husbandry at Massey College, Mr. W. V. Dyer, chairman of the College Council, said that staff and facilities were now available to enable valuable contributions to be made to pig husbandry in New Zealand. He thanked Dr. C. P. McMeekan, Superintendent of the Ruakura Animal Research Station, and his pig husbandry staff, whose experience had been invaluable in the working out of the design of the new buildings at Massey.

Need for Producing Quality Meat

Mr. D. J. Carter, chairman of the Pig Producers Council, expressed his pleasure at the co-operation of the Massey College Council in the national pig breeding scheme inaugurated by his council in conjunction with Ruakura. He stressed the necessity of sending to Britain only the very highest quality meat, particularly bacon. There would have to be strict attention to quality if success were to be attained in overseas marketing of pig meat. His council had been advocating for some time the production of pork. This did not mean neglect of bacon, for which there was a large and profitable market in New Zealand.

Dr. J. F. Filmer, Director of the Animal Research Division of the Department of Agriculture, said that produce of the hybrid sows sponsored by the Pig Producers Council had scored well in open competition this year, particularly as porkers, and would meet a ready demand on the

Illustrations at top of this and opposite pages—Official opening of the Research Piggery at Massey Agricultural College.

British market. The Pig Council's assistance at Ruakura and Massey and the co-operation of the two research institutions was an example of real co-ordination based on understanding, mutual confidence, and a willingness to work together. The Animal Research Division of the Department would always be prepared to co-operate with both the other bodies to assist producers.

Professor W. Riddet, vice-principal of Massey College, said the new buildings had been erected particularly for investigative work but to principles that the farmer could adopt with great advantage. The pig had always been regarded as the poor partner of the dairy cow, but it was not improbable that competition from margarine would force the farmer to raise his returns from butter by using pigs, which reacted remarkably quickly to feeding and management. The national hybrid sows were being produced by crossing selected strains of purebreds, with the purpose of producing fattening pigs, not for breeding. Forty hybrid sows would be tested each year in the new piggery, in which he hoped also that feeding experiments would be carried out with feeds available to the New Zealand farmer. He looked forward to providing a very valuable return on the industry's investment.

Mr. Algie referred to the addition to a great college of an educational facility of outstanding significance. From it would spring something that must have great repercussions throughout a great industry, and he thanked the Pig Producers Council for "a splendid gesture".—*G.J.N.*

Photographs below by Fraser Niederer.

Below: Farmer interest in the extra sow feeding accommodation at Ruakura Animal Research Station during the annual Farmers' Conference at the Station this year. Inset—D. M. Smith, Research Officer in charge of the work at Ruakura on development of the national hybrid sow.

Scrapie Disease Outbreak Necessitates Slaughter of Sheep and Quarantine Measures

THE destruction of all sheep on a farm in Southland where scrapie disease broke out in the early spring and of all sheep on a Canterbury farm where the disease occurred in 1952 was recommended in a report endorsed by the Minister of Agriculture and presented by a special committee appointed by the Government to investigate the outbreaks and recommend control measures. It was recommended that all sheep bought from these two farms should also be destroyed and that all farms that had received sheep from them should be placed under quarantine for 3 years from the date the sheep were received.

THE total number of sheep and lambs to be slaughtered was about 4200 and these were taken from farms from the Bay of Plenty to the Bluff. It has been estimated that up to 150,000 sheep, of which about 25,000 are in the North Island, are affected by the quarantine measure.

Compensation amounting to more than £31,000 is being paid for the destruction of the sheep on the Southland and Canterbury farms where scrapie disease broke out. The special compensation committee of two farmers' and three Government representatives which recommended this compensation will also determine the amounts to be paid to meet smaller claims for stock destroyed on other farms. About £6000 is expected to be recovered through salvage value of the carcasses.

180 Farms Affected by Quarantine Measures

The decision to impose quarantine restrictions will affect about 180 farms, nearly all of which are fat lamb properties. No sheep will be allowed to be moved from these farms unless for slaughter through the works, and restocking of the two infected properties will not be permitted for 3 months from the date of slaughter.

Importation Embargo to Stand

In addition the embargo which has been in force since 1952 on the importation of sheep from Britain, from where the disease was introduced to New Zealand, is to remain. This embargo will not be lifted until steps have been taken to ensure that diseased sheep cannot be sent to the Dominion.

It is considered that the control measures taken will be effective in preventing the spread of the disease, which fortunately has a low infectivity.

The 1952 outbreak of scrapie disease on a farm in the Rakaia district in Canterbury was the first to be reported in New Zealand and occurred among sheep which were imported from Britain and which were released from quarantine early in 1950. All the sheep in the infected stud and all those that had been sold from it were destroyed, the total number being about 225. By this drastic action it was hoped that further spread would be prevented, but the disease on that occasion was apparently not eliminated, because there seems to be a direct connection between the 1952 outbreak and the present one.

Scrapie gets its name from the desire of affected sheep to rub themselves on fences and other objects because of the itchiness of the skin. It is caused by a virus known to be located in the brain, the spinal cord, and the spleen. The disease has been known in Britain for centuries and was confined to the Border counties and parts of Scotland. Since the First World War it has spread to other parts of Britain.

Willing Co-operation of Farmers

In commenting recently on the outbreak and the measures necessary to control it the Minister of Agriculture, Mr. K. J. Holyoake, regretted the need for the destruction of stock and for quarantine conditions, which would cause much hardship. He paid a tribute to the farmers affected for the spirit of co-operation they had shown and for their preparedness to suffer considerable inconvenience for the welfare of their fellow farmers as a whole.

A sheep infected with scrapie disease. As a result of nervous disorder the animal can hardly stand and the intense itchiness which is a symptom of the advanced stages of the disease has caused severe loss of wool.

Vaccination against Contagious Abortion

APPLICATIONS by farmers for vaccination of their calves against contagious abortion in 1955 are now due. The charge is 2s. per calf irrespective of the number involved. The closing date for applications for dairy calves is 14 January and for beef calves 31 July. A late fee of 10s. will be payable on any application received after these dates.

As in previous years members of veterinary clubs should apply to the secretary of their club, and other farmers should apply to their nearest Livestock Instructor, from whom they can obtain the necessary application forms. Applications to Livestock Instructors must be accompanied by a cash payment calculated on the basis of the charge mentioned above.

It is desirable that applications should be sent in as early as possible so that vaccinating officers can arrange the work efficiently. Farmers are therefore requested to forward their applications by 4 January.

Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given as follows from Station 3YA Christchurch during January at 12.20 p.m.:—

3 January—"Weed Control: Sweet Brier", by A. R. Dingwall, Assistant Fields Superintendent, Department of Agriculture, Christchurch.

24 January—"Seasonal Work in the Orchard", by J. Coombe, Horticultural Instructor, Department of Agriculture, Christchurch.

Garden Hygiene and Use of Organic Garden Refuse

JUST as hygiene in the general sense plays a large part in the control of human ailments, so the practising of hygiene in the garden will help to a very large extent in controlling many of the diseases and pests which beset garden crops. In this article, B. P. Coleman, Horticultural Instructor, Department of Agriculture, Auckland, discusses garden hygiene and disposal of garden refuse; the importance of garden hygiene on crop production; and the utilisation of garden refuse in building up and maintenance of a soil of high organic content.

BY many gardeners it is accepted that at certain times of the year plants are attacked by diseases or pests and that the only control is by the direct methods of spraying or laying poison baits. The merits of those methods of control are not to be disputed, but the gardener might well consider where these pests and diseases come from, where they go between the times when they attack crops, and what can be done during the "off-season" to reduce their numbers.

A brief study of the life cycles of some of the diseases and pests suggests that good garden hygiene will assist in control. For example, insects go through varying life cycles which for some include egg, caterpillar or grub, pupa or chrysalis, and adult. Insects may overwinter in the egg stage, in the form of a chrysalis, or in some instances as adults which hibernate. However, though different kinds of pests overwinter in different stages, they all seek shelter during winter to protect them from cold, wet, or attack by birds and other predators. It is also important for their existence that they should not be disturbed, particularly in the chrysalis stage, as any upset may cause the death of the developing insect.

The most common hiding places are in dark situations well protected from weather, though eggs are more often laid in crevices on the plants themselves, where they manage to survive in winter.

To deal with insects during winter all hiding places should be eliminated as far as is practicable; this includes removal of all litter from the garden and the collection of boards, tins, pieces of sacking, or stones and any other such hiding places which may shelter overwintering pests. It is important also that weeds should be kept under control, because many of them give a good deal of protection to pests in cold weather.

Fungous and bacterial diseases may overwinter on suitable host plants or may even be carried over in the soil. Some measure of control can be obtained by destroying all weeds and the remains of garden plants. Apart from the direct control by spraying, little can be done with perennials or shrubs and trees.

Virus diseases, which cannot be controlled by spraying, manifest themselves in a number of ways, including distortion of foliage and twigs, stunted growth, yellowing of leaves, or sometimes only in a general debility in plants. Viruses exist in the sap of plants at all times of the year, though they appear to be more active during the growing season. Many of the viruses which attack garden plants are also to be found on related weeds and consequently there is considerable merit in destruction of weeds at all times of the year, including winter, for reducing the incidence of virus as well as of fungous and insect troubles. Virus diseases are also spread in some instances by insects and therefore the control of insects of certain species, particularly aphides and thrips, contributes toward reduction of the spread of virus diseases. Seriously affected plants should be destroyed by burning, because virus diseases cannot be cured by any known practical method.

Pests such as slugs, snails, and slaters (woodlice) are usually most active during spring and autumn and hide during the daytime. During the

HEADING PHOTOGRAPH: Digging in weeds and green material to increase organic matter. Sparrow photo.

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cold months and in very dry periods these pests hide in dark, moist places where they are protected from attack by birds and where they find conditions sufficiently moist and sheltered from weather to enable them to survive. Some advantage can be taken of these habits, because it will be found that the pests congregate in large numbers under boards, stones, and general refuse in the garden. If these hiding places are destroyed as far as possible, the pests have less chance of surviving and consequently their numbers are greatly reduced before conditions are suitable for them to become active again. While their hiding places are being removed many slugs, snails, and slaters can be killed by hand.

Use of Garden Refuse

As a result of the practice of garden hygiene, plus the normal accumulation of waste plant materials in the garden itself, there is a considerable amount of waste material much of which can be put to a very useful purpose. Inorganic material such as stones, tins, bottles, and odd scraps of metal are of no use in the garden and must be disposed of by removal from the section or by deep burying if a suitable place is available. All organic material, on the other hand, can be returned to the garden either as ash or compost.

Burning is the best treatment for hard, woody materials which are not readily decomposed and also for diseased plant material, either crop residues or weeds known to be affected by virus diseases. The remains of root crops affected with eelworm or club root should also be burnt, as both survive composting.

Compost

The average home garden is heavily cropped, and though it is often well supplied with plant food in the form of commercial fertilisers, it may often be lacking in organic matter. The principal advantages from organic material in the soil are improvement in soil condition and the maintenance of supplies of minor plant foods. The general effect of organic material is to break up heavy clay soils and make them more easily worked and to bind and build up the fertility of very sandy soils. These actions result in better drainage of the heavier soils without reducing their moisture holding capacity and in gradually increasing the moisture holding capacity of sandy soils.

The base of a young carrot (magnified), showing aphis infestation; aphides spread virus disease.

The return of organic material to the soil restores those mineral elements taken out by the plants for use again by the next crop. Where vegetable crops are grown a very considerable part of the plant material produced is removed from the garden and not returned. There is a constant drain on the plant food available in the soil and as far as possible that should be replaced. Organic material should be brought on to the section from outside if possible, as well as use being made of all that is available from garden refuse.

The best way to use organic material is to compost it before returning it to the garden. The general principle of composting is to build the waste material in heaps or in bins where it is allowed to decompose thoroughly before it is used in the garden.

Weed growth and heaps of bricks or rubbish provide breeding and hiding places for snails.

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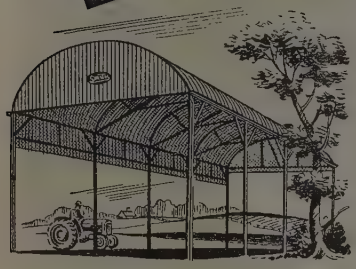

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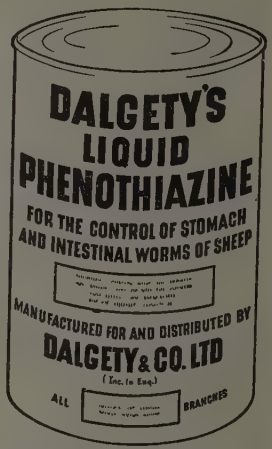

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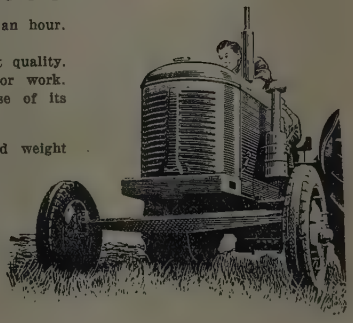

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If this process is completed effectively, there are several advantages. First, because decomposition is accomplished very largely by organisms requiring nitrogen to carry out the process, returning the decomposed material to the garden does not cause a temporary loss of nitrogen in the soil. In addition, many weed seeds and diseases other than those which can be carried in the soil are destroyed.

Composting should be done in bins of a size suitable for the quantity of material to be dealt with and usually about three are needed to allow material to be turned and to provide for material in various stages of decomposition. It is best to add compost materials to the bins in comparatively thin layers, about 3in. or 4in. deep, alternated with thin layers of animal manures or soil to which has been added a small quantity of nitrogenous fertiliser. It is also an advantage to add lime to the heap as it is being built. Compost material must be kept reasonably moist during the process, but should not be excessively wet. Heaps of waste material in a corner of the garden will eventually break down to a suitable condition for use in the garden, but the process usually takes longer and the outsides of the heaps are never effectively decomposed.

Materials suitable for composting include all soft weed or garden plant material, household refuse, and even softer hedge clippings. If straw or animal manures are obtainable, they should be added to the compost and will increase the bulk and value of the resultant humus.

It is important, however, that material affected by diseases likely to carry over in the soil or containing viable weed seeds should be burnt.

[*Green and Hahn*

An easily and cheaply constructed 3-compartment compost bin.

Digging in Organic Material

It is common practice in many home gardens to grow crops of lupins or mustard for digging into the soil as green crops. In addition to that practice it is possible to make use of a certain amount of organic material in the form of pea haulms or bean vines and other material which will decompose fairly quickly when dug directly into the soil. It is not advisable to dig in the more solid forms of organic material, as they take a considerable time to break down and during the process there may be a temporary shortage of nitrogen in the soil. When organic material is worked into the soil it should be incorporated as evenly as possible rather than covered in layers where it may remain undecomposed for a considerable time.

[*Sparrow*

Composting vegetable waste. The heap on the right has been covered with soil to prevent undue drying out.

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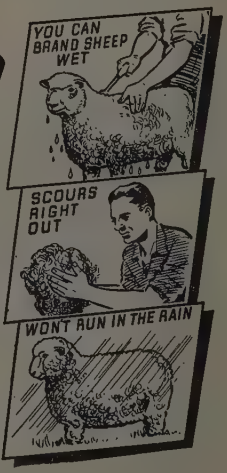

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The coarser organic material may be worked into the soil if the garden is being trenched deeply; it should be placed in the lower spits, where eventually it will help to some extent to keep the soil open at a lower level.

Deep trenching may be recommended as an initial method of preparing a new garden and is very useful, particularly in heavy soils, but it should not be done every year. Unless soil conditions are very unfavourable, normal deep digging may be carried out for a considerable number of years without any need for deep trenching.

The practice of garden hygiene and the use of organic materials, both of which are valuable in the home garden, are closely related. Garden hygiene will not eliminate all diseases and pests, but will contribute toward that end and may assist considerably in the disease control programme which will have to be carried out later. The use of organic material from the garden and other sources is unlikely to provide sufficient plant food for the crops to be grown in the garden, but it will help to improve the general soil condition and will add to the effectiveness of commercial fertilisers which may be used. These two practices are very valuable parts of the garden programme and should not be neglected.

[*Sparrow*

It is essential to spray tomatoes regularly with Bordeaux mixture at recommended strengths or copper oxychloride to ward off attack by late blight.

[*Photo News*

Regular and frequent picking of beans will prolong their cropping period.

Work for January

In January some gardeners' enthusiasm is ebbing, but it is a very important month if supplies of vegetables are to be available through late autumn and winter. The work done now will demonstrate whether the gardener is efficient or merely a springtime enthusiast.

At this time the garden is often fully planted, but many of the crops are past their best and will not last much longer. These should be removed to make way for the winter supply of vegetables, or it may be possible to plant the winter vegetables between the present crop rows.

In most gardens this month there will be a good growth of weeds which have developed during the holidays. These should be attacked as soon as possible to reduce the competition for soil moisture. Weeds are readily controlled at this time of year. When hoed up they die rapidly in the hot sun and do not need to be collected.

Maturing crops should be tended as follows:—

Tomato plants should be sprayed, regularly pruned, and tied to supports as they continue to grow. Care should be taken that too many leaves are not removed or the fruit may be damaged by the hot sun.

Asparagus and rhubarb should be kept free of weeds and mulched and manured.

Sweet corn should be moulded up and tied to stakes if subjected to strong winds. At the first sign of caterpillars attacking the cobs they should be sprayed or dusted with D.D.T. Cobs should be picked frequently as the husks become well filled and tight.

Potatoes should be moulded up to increase the crop and protect them from tuber moth attacks. Moulding up will also help to protect the tubers from late blight spores dropped from infected foliage. Maturing crops should be dug for use as required. If the whole crop is mature and fit for storage, it should be dug, as wet weather may induce tubers to sprout. All potatoes should be sprayed with Bordeaux mixture or a certified copper fungicide to guard against late blight.

Pumpkins and similar trailing plants should have their terminal shoots pinched out to induce the growth of fruiting laterals.

Onions and shallots should not be watered, as dry conditions promote better ripening. If onions are still growing, the tops may be bent over to hasten ripening. Neither of these crops should be harvested for storage until the tops have withered.

Peas and beans and leaf vegetables such as lettuce should be well supplied with water to maintain fast growth and prolong cropping. If water is short, soil moisture may be conserved by mulching.

Lettuce and other leaf crops will benefit from applications of liquid manure.

Summer cabbages and cauliflowers should be well sprayed or dusted. To

control caterpillars use D.D.T. and to control aphides used B.H.C. wettable powders.

Harvesting

Regular, frequent picking of peas and beans will prolong their cropping period. Marrows should be cut as they mature. Cucumbers should be harvested when slightly immature, as their flavour is best then.

Tomatoes should be picked as they ripen but before they become soft. This will avoid damage by birds and allow the later fruits to develop properly.

Thinning of Seedlings

Young seedlings should be thinned as soon as possible after germination. This is best done after rain or after the ground has been well watered. In wet soil individual plants can be more readily removed without disturbing neighbouring plants. Thinning under dry conditions often causes the death of many of the remaining plants.

Sowing

A number of crops can still be sown and there is a good chance of success provided water is available. Salad crops such as radish, mustard, cress, and lettuce may be sown. Lettuce are better sown in their rows and thinned out rather than transplanted at this time of year.

Carrots, beetroot, turnips, peas, dwarf beans, and silver and spinach beet can still be sown. Spinach may be sown, though as an alternative under hot, dry conditions, tampala does well.

Carrots: Quick maturing varieties such as Scarlet Horn for short season districts and Chantenay and Manchester Table for winter use in other districts are recommended.

Peas: Suitable varieties include Onward, Greenfeast, and Victory Freezer. In short season districts toward the end of the month sowings should be restricted to early varieties such as William Massey, Little Marvel, or Blue Bantam.

Beans: In northern districts runner beans can still be sown in early January. In most districts dwarf varieties such as Prince may be sown.

Planting

January is one of the best months and probably the most popular month for setting out plants of winter vegetables.

Leeks should be set out in well-manured ground, either in trenches or in holes made with a dibble. Plants are best set in beds with rows 6in. to 8in. apart and plants 4in. to 6in. apart in the rows.

The dibble hole method of planting is very simple and the plants subsequently need much less maintenance than those planted by any other method. Holes are made by pushing the dibble into the ground to a depth of 6in. to 9in. The plants are dropped in and the bed well watered. Hosing washes a little soil into each hole and so covers the roots and gives the plant a start. The plants, being mostly below ground, are little affected by wind or heat. Later, applications of manure are similarly watered in.

Celery may be planted in trenches or set out in beds. The bed method is simpler, but beds should be restricted to about 4 rows for easy working. Plants should be set out in rows 6in. to 8in. apart and the plants spaced 6in. to 8in. in the rows. By alternating the plants in neighbouring rows these spacings should be adequate. Though this method requires more handwork, the close spacing causes self-blanching of the stems as the plants grow. Celery should be given plenty of water and manure.

Brassica crops: Plants of cauliflower, cabbage, and Brussels sprouts should be set out this month. These plants should be well watered in at planting if conditions are dry so that they do not receive too great a check.

Death of Mr. W. M. Singleton

THE death of Mr. Winnard Milton Singleton, Director of the Dairy Division of the Department of Agriculture from 1921 until his retirement in 1944, occurred at Wellington recently. He was 76 years of age. One of several Canadians—Ruddick, MacEwan, Kinsella, to name a few—who have played a prominent part in the building of the great dairy industry of New Zealand, Mr. Singleton gave more than 40 years' service to the industry.

HE was born on a dairy farm in Ontario and at an early age he entered a dairy factory, learnt cheesemaking and buttermaking, became manager, and later was appointed superintendent to a number of factories, a position similar to that of an instructor. He attended dairy schools and earned diplomas from three of the foremost dairy schools of North America. At the Madison School he was employed as an instructor, and in 1901 he came to New Zealand as an instructor. After 8 years on the instructional and grading staff Mr. Singleton was appointed Assistant Director of the Dairy Division in 1909, and on Mr. D. Cuddie's retirement in 1921, he became Director. As an instructor he introduced prepared pure culture starters, the curd test, and the acidimeter to New Zealand cheesemakers. These are still major factors in cheesemaking.

Foundation of Herd-testing System

During his first year as Assistant Director he introduced the systematic testing of dairy herds for yield, and in 1912 the Certificate-of-Record Testing of Purebred Dairy Cows was introduced. These systems were the foundation of the herd-testing system of today.

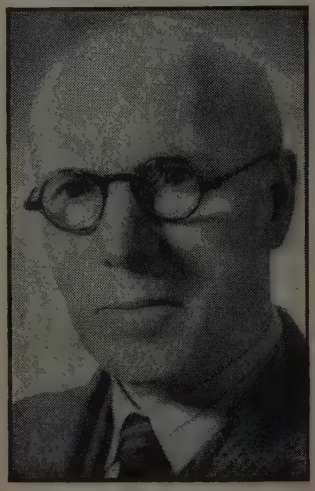
By the time he was appointed Director of the Dairy Division methods of manufacturing butter and cheese had settled down to a more or less accepted standard procedure and consequently his energies were devoted mainly to administration and organisation. Much was accomplished during the ensuing years and many difficulties were overcome, with a result that on his retirement the New Zealand dairy industry was on a better footing than ever before.

Farm Dairy Instruction

Mr. Singleton also prepared a series of regulations to meet the changing needs of the industry and all of them served well in their time. In 1928-29 he visited the United States, Canada, Britain, and the Continent to study export and manufacturing problems. In 1938 he introduced the farm dairy instruction service, which has proved to be an essential link in the chain of instruction and supervision.

During his term of office the value of dairy exports almost doubled. His experience in the First World War well qualified him to meet difficulties which arose in the industry during the Second World War. He used his endless tact and mature judgment in the solution of problems of staffing, the maintenance of quality, and many others brought by the war.

He continued his interest in dairy farming after his retirement by developing land in the Waitomo and Otorohanga districts in partnership with the late Mr. W. Dempster.



Mr. W. M. Singleton.

Mr. Singleton's career was characterised by honesty of purpose, fearlessness, and far-sighted administration. He stressed instruction rather than inspection and co-operation rather than coercion, and innovations introduced during his career were either suggested or fully accepted by the industry.

In length of service and achievement his record stands high and he has left behind him an example which will long serve as a guide to the industry and the Dairy Division.

Treatment of Common Household Poultry Ailments

POULTRY of all ages are subject to diseases, the majority of which do not warrant treatment by household poultry keepers. In this article H. K. Mullins, Poultry Instructor, Department of Agriculture, Hastings, discusses the treatment of some of the more common poultry ailments which cause concern to household poultry keepers. For those who rear chickens a disease common among young birds is also described.

[*Niederer*

An Australorp affected with scaly leg. The scales on the feet and legs have been lifted by the mites.

Crop Binding

One of the more common complaints experienced in household poultry flocks is crop binding. This trouble usually arises from the birds eating fibrous material such as long, dry grass or from swallowing large foreign bodies that block the outlet from the crop to the digestive tract, thus preventing passage of food to the gizzard.

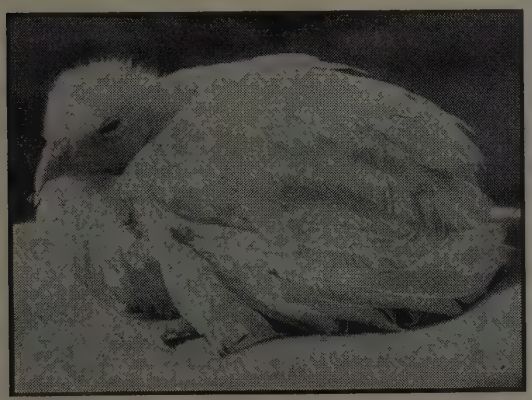
It is common practice among most gardeners to toss weeds and long grass into the fowl run, and as fowls have no teeth they must swallow the grass in whatever length it may be. Silver beet and other such succulent greens can do little harm, but coarse grass is tough and will readily form itself into a hard fibrous ball in the crop.

If the impacted mass is not too large and firm, it may often be removed by first introducing water into the crop through the mouth and then gently massaging the crop in order to work the mass out through the gullet a little at a time. This is more easily done if the fowl is suspended head downward. Do not spend too long over this expulsion or the bird, particularly an old one, may be asphyxiated. It will usually be found, however, that surgical treatment is necessary to remove the obstruction successfully. It is a comparatively easy operation and should provide no difficulties for even the amateur poultry keeper. The easiest method is to have an assistant hold the bird securely on a table while the operator makes an incision through the skin and crop wall with a sharp razor blade. The incision, which should not be more than approximately 1in. long, can be made on the upper surface of the crop, thus eliminating any undue strain on the wound when the bird begins to feed. After the food mass is cleaned out the crop should be washed out with clean warm water and the incisions in both the crop wall and the skin closed separately by the insertion of several stitches in each. These can be made with ordinary cotton, and each stitch should be made and tied separately. The bird can now be placed in a coop, but food should be withheld for a day, after which soft food only should be fed until the wound is healed.

Scaly Leg

The condition known as scaly leg in fowls is caused by very small mites which burrow under the scales on the shanks. The severe irritation which is set up by the activities of the mites results in the accumulation of greyish, dry debris under the scales which forces the scales to lift and loosen. If the condition is left untreated, the feet may become deformed, resulting in the bird going lame.

Treatment for scaly leg is not difficult. The legs of the bird should be washed in warm soapy water to remove all dirt and foreign matter. The bird is then stood in a tin containing a mixture of two parts of kerosene and one part of creosote. This is an effective cure, but care should be exercised to see that the mixture does not get on the skin above the hocks or burning may result. In severe cases of scaly leg a second treatment may be necessary a week later.



A young White Leghorn pullet affected with caecal coccidiosis.

Caecal Coccidiosis

Coccidiosis is probably the most prevalent disease among young stock in New Zealand and causes heavy losses every year, particularly on commercial establishments. The disease, which is recognised by most poultry producers as being caused by faulty management, usually occurs from overcrowding in the brooder sheds, poor ventilation under the brooders, or housing the chickens on green concrete. Chickens about 3 weeks of age are most susceptible to caecal coccidiosis, but the adult form of the disease attacks birds slightly older.

Symptoms

Chicks suffering from caecal coccidiosis usually show droopiness and depression as the first symptoms. The chicks stand huddled, with wings dropped, feathers ruffled, and eyes closed. The droppings are usually loose and contain a good deal of blood in severe outbreaks. Losses occur after 3 or 4 days. A number of chickens may recover, but if infection has been severe the survivors are usually unthrifty and therefore uneconomic.

Control

There are various drugs on the market which are very effective in controlling coccidiosis. However, it is more important to eliminate the source of the trouble than rely solely on drugs as a cure. Thorough cleaning and disinfection of all floors, feed

troughs, and watering utensils is imperative after an outbreak of coccidiosis. The frequent removal of droppings and litter is also necessary, and the cleaning of utensils must be repeated at frequent intervals. Stale ground should be limed and turned over in autumn. It should be remembered that the sun can accomplish far more than any disinfectant in killing the disease. The floor under the hover or brooding equipment should be checked for dampness. Damp floors can play havoc with young chickens and have been responsible for many outbreaks of disease. It is a wise precaution to place a square frame covered with ½in. netting under the brooder for the chickens to sleep on where there is any risk of dampness. This frame can be covered with chaff for the first week, after which the chickens can sleep on the bare netting. By using these frames the chickens are not only prevented from having access to their droppings but are ensured of improved ventilation. Young chickens should never be permitted to run with older fowls which may be eliminating oocysts through their droppings. Any attempt to control coccidiosis must have as its basis the employment of strict measures of sanitation.

Cannibalism

Cannibalism, which is prevalent in many household flocks, can cause severe losses if immediate treatment is neglected. It may break out in various forms, but feather picking and vent picking are the more common forms. Generally cannibalism originates from overcrowding, but greenfeed deficiency or lack of salt may also cause an outbreak of the trouble. It is most uncommon to have an outbreak of cannibalism in birds housed on free range or even on the semi-intensive system. Insufficient nests, particularly in flush of the season, may also contribute to an outbreak of cannibalism. Broody hens should be removed every evening, thus ensuring that all nests are available to the laying stock.

"Farm Animals in Health and Disease": W. R. Wooldridge

"FARM Animals in Health and Disease" is a good book. Part I contains chapters on good health, ill health, the cause of ill health, the control of disease, and livestock health in the future. Part II deals with the diseases of cattle, sheep, goats, pigs, horses, poultry, and rabbits.

Part I in particular can be recommended to New Zealand farmers because it presents, perhaps for the first time, a sound assessment of the impact of health and disease on the economics of animal production.

The following extracts from Chapter 1 give a good indication of the author's sympathetic understanding of the farmer's philosophy and also indicate the general aim of the book: "From the angle of the farmer an animal is in good health when it makes good growth or produces well upon a normal well-balanced diet. If it does less work or is infertile or produces less milk, meat, eggs, or wool than it should, either from specific disease or because it wastes food by carrying a heavy burden of parasites, then it is not only uneconomic but also unwell. . . . To the farmer or average owner of animals good health is that state of his animals which allows them to give their maximum yield or highest performance. It is, therefore, important for the animal keeper or owner to know how the body of the animal works so that the effects of the many factors of management upon this working are well understood."

Some allowance must be made for the fact that the author is an English veterinarian and that the book is written primarily for British farmers, of whom he says in the introduction: "They are justifiably proud of their reputation as animal husbandmen and will talk upon every aspect of their craft except that of ill health and disease. Ostrich like, they seem to believe that the problems associated with the development and maintenance of good health are simplified by endeavouring to belittle or forget them". Obviously the author has not heard New Zealand farmers in full cry on the subjects of facial eczema, sterility, bloat, or foot-rot.

Some of the advice concerning treatment and control of specific diseases is obviously designed to suit British conditions and may not be so effective here as measures which have been devised in New Zealand. On the other hand New Zealand farmers can profitably read about the cost to their British confreres of scourges like foot and mouth disease, warble flies, and swine fever.

The chapter on livestock health in the future starts as follows: "In the foregoing chapters we have considered the means by which the health of our livestock can be improved. The basic condition is that those caring for animals shall be really interested in them and have a working knowledge of how the animal body functions. This interest must be founded upon a broad education and will perforce be related to some extent with the economic value of livestock and the demand for their products." New Zealand farmers could well continue their "broad education" by reading this book.

—J.F.F.

Crosby Lockwood & Son Ltd. 30s.

"Agricultural Botany": J. S. Yeates and Ella O. Campbell

ANY book which can make the task of studying easier and the results of that study more profitable will be welcomed by students. "Agricultural Botany" is such a book. It is written in an easily read style, the subject matter being abundantly supported by examples taken from plants, most of which can be found throughout the country.

The written work is well elaborated by the use of a large number of good line drawings appropriately interspersed with suitable photographs.

A pleasing feature is the space that is given to the study of plant communities, several contrasting examples being discussed in sufficient detail to create a desire in the reader to study others. Such studies are essential, because in them culminate the value of many of the other subjects dealt with.

"Agricultural Botany" can be confidently recommended for use in high schools and agricultural colleges. The keen horticulturist and farmer will find it of interest, but should not expect to find in its pages detailed discussions on the broader aspects of horticultural or agricultural practice.

—S.H.S.

Government Printer. 25s.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during October and for the 3 months ended 31 October 1954, with comparative figures for the same month and 3-monthly period of 1953, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage increase or decrease
October 1954	21,420	402	21,822	—
October 1953	21,305	412	21,717	—
Increase or decrease	+115	—10	+105	.483
3 months ended 31/10/54	47,030	808	47,838	—
3 months ended 31/10/53	46,763	845	47,608	—
Increase or decrease	+267	—37	+230	.483

Butter in store at 31 October 1954 was 16,985 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage increase or decrease
October 1954	9,786	3,093	12,879	—
October 1953	12,166	11	12,177	—
Increase or decrease	—2,380	+3,082	+702	5.764
3 months ended 31/10/54	19,052	4,100	23,152	—
3 months ended 31/10/53	21,517	29	21,546	—
Increase or decrease	—2,465	+4,071	+1,606	7.453

Cheese in store at 31 October 1954 was 12,364 tons

If these figures are converted into butterfat equivalent, there is an increase of 1.663 per cent. in butterfat graded for the 3 months as compared with the corresponding period of the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time they are not necessarily a true indication of production trends.

Producing Quality Beef from Dairy Stock

THERE appears to be an assured export market for meat, particularly beef. For this reason increased meat production is being emphasised in the Dominion's agricultural policy. Apart from the market for beef in the United Kingdom, other channels of sale which could be exploited are opening. Generally, the world is short of beef. This article, adapted from an address given at the Ruakura Farmers' Conference 1954 by P. Radford, Research Officer, Ruakura Animal Research Station, Department of Agriculture, Hamilton, describes the results of tests carried out at Ruakura with progeny of Jersey and Aberdeen Angus cattle and appraises prospects of beef production from dairy stock.

THE dairy farmer has on his farm the raw material from which to produce beef and veal. Each year the progeny of over 1,000,000 dairy cows are slaughtered within a few days of birth as "bobby" calves. The product is low-grade, low-priced meat. The major overhead cost in meat production—that of maintaining the mother during her 9 months of pregnancy—has already been paid. A substantial proportion of these mothers could be used as incubators for the production of calves with a better beef potential. Such calves would provide extremely cheap raw material for fattening, since such a method would not involve the maintenance of heavy beef-breeding cows which would return only the value of their calves.

It is true that the specialised dairy breeds are not good beef producers. The Jersey, particularly, has a poor reputation for fleshing qualities, fat cover, and fat marbling, and suffers from the major defect of yellow fat.

Because of the national importance of the problem, however, Ruakura has been investigating the possibility of producing a saleable veal and beef quality animal from Jersey cows by crossing them with a highly improved beef breed. For this purpose the Aberdeen Angus has been selected and the results of some preliminary studies are given here.

It is obvious that crossbred stock of this type and origin may contribute to increased beef production and to increased diversification of dairy farming in varying ways. Two obvious avenues are in the production of good-quality veal and of young, light beef of 500lb. carcass weight.

In the first method the dairy farmer would employ the stock to use separated milk surplus to pig-keeping needs and sell them direct to butchers or exporters as veal. In the second he could sell the stock as weaners, runners, or stores to fat lamb farmers requiring cattle for fattening. Ruakura experiments so far have aimed at studying these two systems only.

PRODUCTION OF VEAL

In this study there were three main objectives:—

1. **Measurement** of the performance of crossbred calves in terms of rate and efficiency of liveweight gains.
2. **Assessment** of the carcass quality of crossbreds as commercial vealers.

Fig. 1—Crossbred calves 8 months old. The calves in the upper illustration were weaned at 8 weeks of age and those in the lower illustration at 18 weeks.

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3. **Estimation** of the financial returns likely from the utilisation of separated milk in veal production.

Two experiments have been completed, the first with a group of 10 autumn-born calves, and the second with a group of 12 spring-born animals. Though autumn-dropped animals are not likely ever to be very important in total available numbers, their performance under hand-rearing conditions was considered likely to be similar to that of spring-born stock, and their use made it possible for the work to start several months earlier.

The autumn calves were purchased when 2 days old from a nearby town supply farmer, and the spring lot from a butterfat supply herd in which the cows were predominantly Jersey type. Most of the calves varied from light to dark brown when bought, but were uniformly black when slaughtered. A few from one herd, though by an Aberdeen Angus bull, were red at birth and did not change colour with age. All were polled.

Procedure in Trial

The aim in feeding was to keep the amount of whole milk used at a minimum and the separated milk at a maximum. Thus whole-milk feeding followed the pattern found effective in the rearing of dairy calves at Ruakura. Whole milk alone was fed for 3 weeks at the rate of 8 pints per day in 2 feeds. In the next 3 weeks this rate was tapered off and separated milk was used to replace the whole milk, until at 6 weeks only separated milk was fed. Full feeding was practised thereafter. Table 1 shows the feeding rates used.

It will be noted that an even smaller whole-milk ration was fed to spring-born calves. This was to reduce costs. Tapering off started after the first week and separated-milk feeding began 2 weeks earlier. In another experiment there has been a further reduction in feeding of whole milk, feeding of it being stopped after 4 weeks instead of 6 weeks.

All calves were allowed free access to good-quality pasture from the beginning of the experiment. Rotational grazing was practised as recommended by Ruakura in the rearing of dairy calves. The experiment terminated at 17 weeks for the autumn calves and 18 weeks for the spring calves. The animals were slaughtered and the carcasses were examined carefully for quality. A sample of 6 calves (3 of each sex) was dissected to provide data on the make-up of the carcasses.

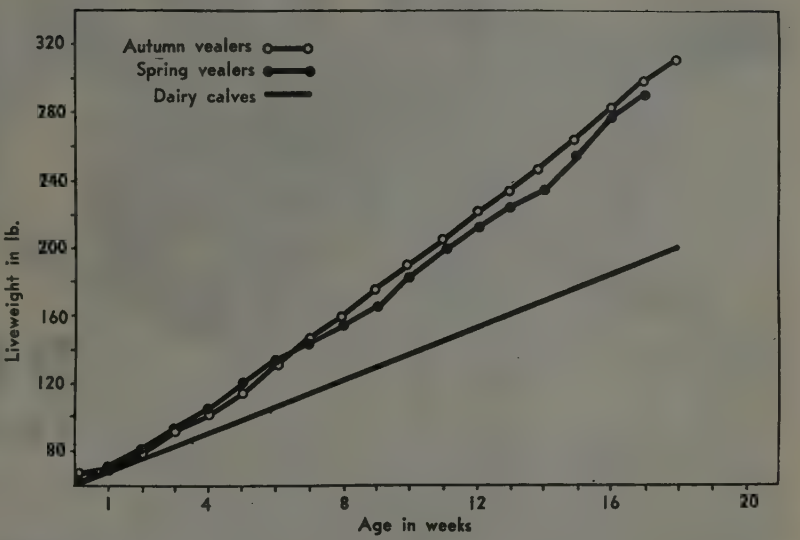


Fig. 2—Average weekly liveweight gains of autumn and spring vealers and dairy cattle.

Rate and Efficiency of Gain

All calves grew very well, making gains substantially better than very well reared Jersey calves fed similarly and rotationally grazed. Growth rates for the two groups and for straight Jerseys are shown in Fig. 2.

The crossbred calves averaged 63lb. at 2 days of age on arrival at Ruakura. This corresponds to a "birth weight" very close to that of both straight Jerseys and straight Aberdeens.

The autumn group averaged 292lb. at 17 weeks, an average weekly liveweight increase of 13½lb. The corresponding figure for the spring group was 296lb., so the weekly gain was practically the same. This group averaged 310lb. when slaughtered at 18 weeks. These growth rates are very similar to those of bust-fed straight Aberdeen Angus calves.

These gains were made on a total of 35 gallons of whole milk and 315 gallons of separated milk fed to the autumn group and 26 gallons of whole milk and 363 gallons of separated milk to the spring group. If whole milk is considered to have twice the feeding value of separated milk, the autumn group required 385 gallons of separated milk equivalent, and the spring group 415 gallons. Though the latter group were fed a week longer for a greater total gain, the efficiency of the two groups was the same. The calves of each group required an average of 16 pints of separated milk equivalent for each pound of liveweight, and 23 pints for each pound of final dressed carcass.

The uniform behaviour of the two groups has thus justified the assumption that during hand feeding the time of birth should not materially affect performance.

TABLE 1—VEAL CALF RATIONS

Age weeks	Pints whole milk daily		Pints skimmed milk daily	
	Autumn	Spring	Autumn	Spring
0-1	8	8	—	—
1-2	8	7	—	4
2-3	8	6	—	8
3-4	8	6	4	8
4-5	4	2	12	18
5-6	4	1	16	24
6-7	—	—	24	28
7-8	—	—	28	ad lib.
8-18	—	—	ad lib.	ad lib.
Total (gallons)	35	26½	315	363

Carcass Quality

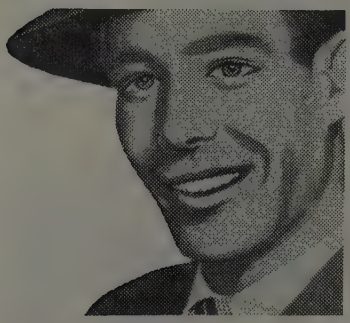
The type of animal resulting is illustrated in Fig. 3, which shows an average autumn-born calf at birth and just before slaughter at 18 weeks. It is a good-type beef-quality animal, showing marked evidence of the blockiness of the Aberdeen Angus.

The calves were slaughtered at Ruakura. The autumn group averaged 130lb. dressed weight, with a dressing-out percentage of 52. The spring group averaged 143lb., with the same dressing-out percentage. A typical carcass is shown in Fig. 4. The following is a fair summary of the average quality of the carcasses.

On a New Zealand grading basis all were in the prime class. They carried a good proportion of flesh and had light bone and no obvious waste. Despite the good grading results, however, a fair criticism was that they all had insufficient fat cover for really top-quality veal. This opinion was shared by experienced butchers.

As mentioned earlier, 6 carcasses were dissected. Carcass composition examination supported the above opinion. Fleshing was good, with an average carcass content of 70 per cent. muscle or lean meat tissue. Bone averaged 20 per cent. of the total carcass, which is reasonable for such lightweights. Fat was light at 8 per cent. Waste and dissection loss was very low at 2 per cent.

Of special interest was fat colour. In no carcass was there any evidence of yellow fat. Every carcass carried fat of a good white colour. This result is the same as that recorded at Ruakura several years ago when 20 bust-fed Aberdeen Angus-Jersey cross heavy vealers or runners were slaughtered at approximately 8 months of



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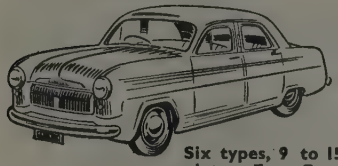

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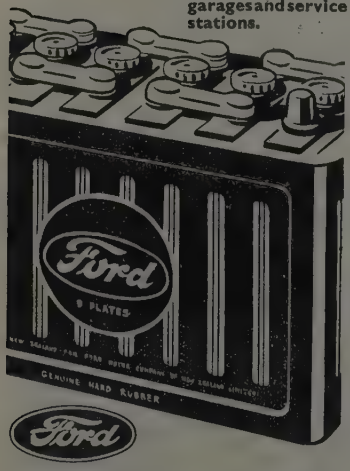

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age. Here also no yellow fat was observed and fat colour was white and texture uniform and firm. Colour of muscle is also important. High-quality veal must have very light-coloured flesh, and the crossbred calves in both groups came out very well in this respect, the flesh being very pale. However, muscle colour was not as light as was obtained in Britain with vealers hand reared in the dark on whole milk, the method used before the war in the production of highest-price meat of this type.

No criticism of the eating quality of the meat was received by the butchers. There is no doubt that an easily saleable, good-quality product was obtained.

Financial Returns

The cost of production and the returns per gallon of separated milk used are set out in Table 2.

TABLE 2—REARING COSTS

Autumn	Cost	Spring	Cost
	£ s. d.		£ s. d.
Calf ..	1 10 0	Calf ..	1 10 0
35 gallons of whole milk	2 12 6	26 gallons of whole milk	1 19 0
	4 2 6		3 9 0
Return per gallon of skimmed milk ..	3.6d.	Return per gallon of skimmed milk ..	4.4d.

To arrive at these figures the cost of the calf at birth has been assessed at its bobby calf value of 30s. The whole milk used has been fully charged at 1s. 6d. per gallon. The veal has been valued at 1s. 6d. per pound. This latter figure has been obtained after consultation with local butchers, meat exporters, and by observation of local trade prices and probably represents a fair-value figure over a season. It can be considerably higher at times on the local market, depending on supply and demand.

The cost of feeding, including calf cost, was higher for the autumn group than for the spring group owing to the larger amount of high-priced whole milk used with this group. For the same reason the net return per gallon of separated milk was higher with the spring group. Average cost per head for both lots was thus £3 15s., and return per gallon of separated milk 4d.

At 1s. 6d. per pound the average return from a 136lb. carcass was £10 4s., which gives an average margin over calf and whole-milk costs of approximately £7.

Since the production of veal of this type and in this manner on a dairy farm is an alternative or an addition to pig production, it is of interest to compare the financial returns from calves with those from pork production, which Ruakura work has shown to be the most profitable method of utilising separated milk in pig raising.

Table 3 makes this comparison. The returns per gallon from pigs are based on the performance results of pork production in the Ruakura piggery, where pig quality and feeding and management methods are probably well above standard. On this basis a greater cash return from pork is shown. There is much evidence to suggest, however, that a figure of 4½d. per gallon is nearer the return of good pig producers in practice. Since feeding, housing, and management costs are likely to be much less in calf raising than in pig keeping, it is reasonable to suggest that the possibilities of profit from veal production on dairy farms are more attractive than those from pig production.

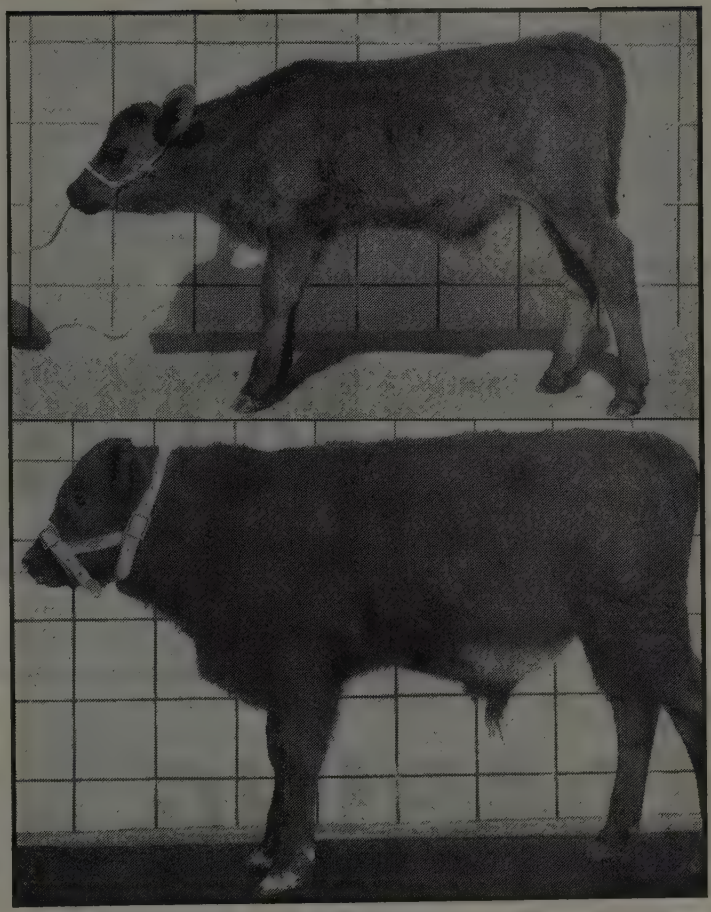

Fig. 3—Upper: An average autumn-born calf at birth. Lower: The same calf at 18 weeks of age.

TABLE 3—EXPECTED FINANCIAL RETURNS FROM VEAL CALVES AND PORK PIGS

	Calves	Pigs
	s. d.	s. d.
Carcass value	1 6	1 9
Return per gallon of skimmed milk	*4	5.3

* Allowing for 45s. worth of butterfat consumed.

PRODUCTION OF LIGHTWEIGHT BEEF

In this study, which unfortunately is not complete, the objective has been to see whether Aberdeen Angus-Jersey calves reared principally on separated milk and grazed on good pasture will produce good-quality lightweight beef carcasses before they are 2 years old.

Twenty-two calves were purchased in the spring of 1953. All were out of Jersey cows from Angus bulls. They were started off at Ruakura on hand feeding when 2 days old.

To reduce costs the whole-milk feeding system, with a total of 26 gallons per calf, was the same as that for the spring-fed vealer group. As a further method of reducing costs feed intake of separated milk was limited to a maximum of 28 pints per day, in two feeds. As a still further approach to cost reduction, both in feed and labour, half the number were weaned at 8 weeks and the remainder went through on hand feeding until they were 18 weeks old, the weaning age of the spring group of vealers. Work with Jersey dairy calves at Ruakura has shown early weaning to be practical under the pasture and management conditions possible in New Zealand. The feeding chart used is set out in Table 4.

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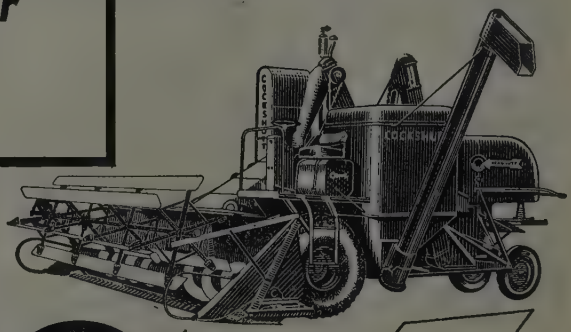

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TABLE 4—RATIONS FED TO EARLY- AND LATE-WEANED CROSSBRED CALVES

Age weeks	Pints whole milk daily (both groups)	Pints skimmed milk daily Weaned 18 weeks	Weaned 8 weeks
0-1	8	—	—
1-2	7	4	4
2-3	6	8	8
3-4	6	8	8
4-5	2	18	18
5-6	1	24	24
6-7	—	28	20
7-8	—	28	12
8-15	—	28	—
15-16	—	24	—
16-17	—	16	—
17-18	—	8	—
Total (gallons)	26	316	82

All calves were grazed together on the rotational plan on one of the Ruakura dairy farms until 18 weeks. Thereafter they were transferred to one of the sheep areas for eventual fattening on country running 6 ewes per acre.

Rate, Efficiency, and Value of Gain

The growth curves of the two groups are shown in Fig. 5. The period covers 22 weeks. At 18 weeks —an age comparable with that of the spring-fed vealer group, which was reared at the same time—the average weight was 296lb. for the group weaned at 18 weeks and 233lb. for those weaned at 8 weeks. Thus, early weaning retarded growth-rate by 63lb. At 22 weeks this difference had been reduced to 30lb. At approximately 44 weeks the difference was only 10lb.

This kind of result from early weaning is in close agreement with those obtained from several years' experience of early weaning of straight Jersey calves in Ruakura experiments. An initial difference between normal weaning and early weaning has always been made up by the beginning of winter (at approximately 8 months of age). From several experiences of this kind with straight dairy-type stock the performance of the early-weaned crossbred calves suggests that the practice could be adopted as eminently practical under conditions where saving of labour and milk is important. At the same time, as J. C. Percival has emphasised from his early-weaning studies, the practice cannot be recommended unless rotational grazing management on a frequent shift-good quality pasture basis is used with it.

A further picture of the type of liveweight growth obtained is shown in Fig. 6. Reared in the way described, the group weaned at 18 weeks, which had limited feed, grew less fast than the vealer group which was full fed, or than the bust-fed Aberdeens, but substantially better than the straight Jerseys.

Finally, it may be noted that both the early-weaned and the late-weaned groups used 26 gallons of whole milk. If the cost of the calf is taken at 30s., and whole milk is valued at 1s. 6d. per gallon, the cost of production was £3 9s. each. The early-weaned group used 82 gallons of separated milk and the late-weaned 316 gallons.

If the separated milk fed is valued at 4d. per gallon, the early-weaned group would have to average £4 16s. per head and the late-weaned group £8 14s. when sold as weaners for fattening to give the same return as that from vealers or from pork production. Valuation at weaning for sale in this way placed the early-weaned group at £8 and the late-weaned group at £9 a head.

After the transfer of the calves to the sheep farm grazing management continued on a rotational plan. The grass conditions were poor initially owing to the severe dry period experienced in summer, but autumn and early winter grass supply was very good. Except for a check during summer, calf growth continued to be very good. In mid-June the early-weaned group averaged 436lb. and the late-weaned group 446lb. This figure may be compared with the 448lb. of straight Aberdeen Angus calves born

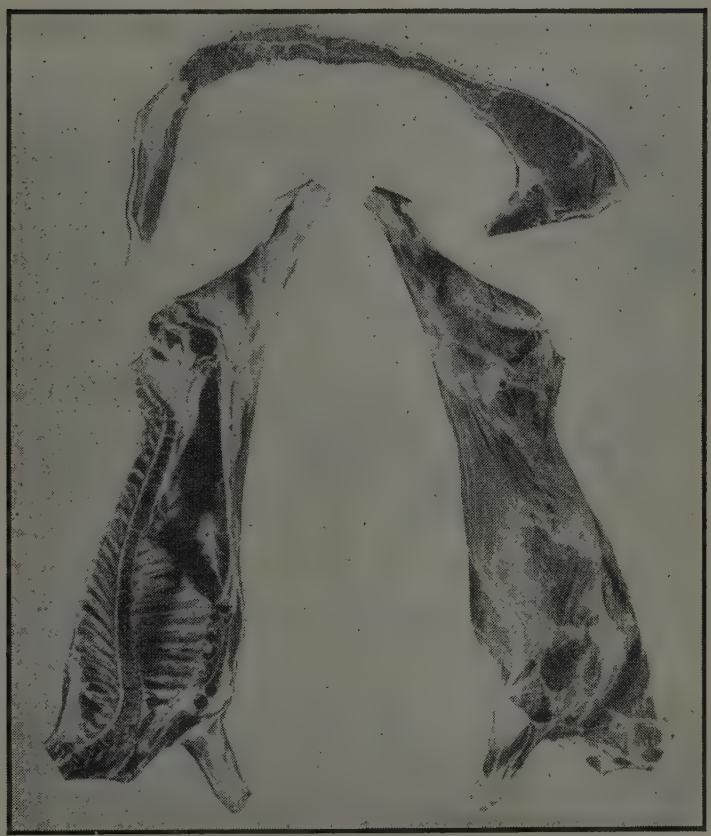

Fig. 4—A typical veal carcass from an autumn-born calf slaughtered at 17 weeks of age.

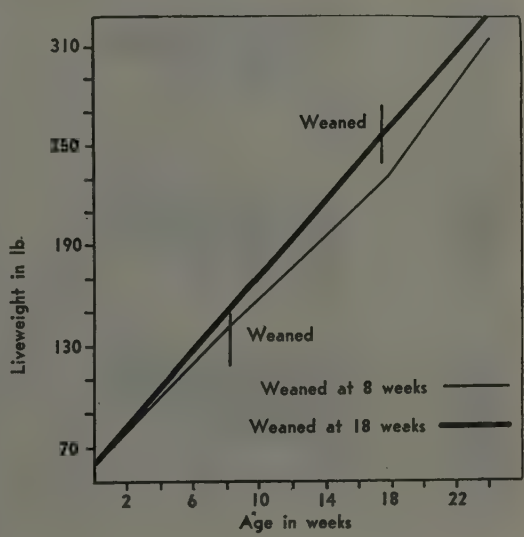

Fig. 5—Growth-rates of early-weaned and late-weaned calves.

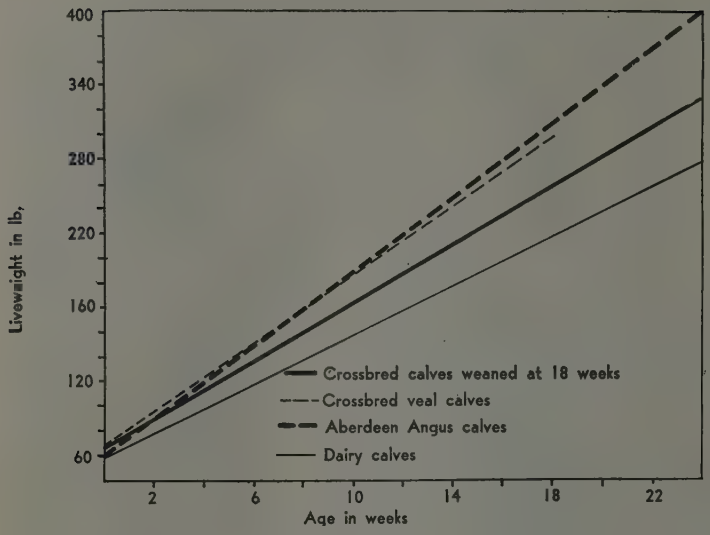

Fig. 6—Growth-rates of crossbred, Aberdeen Angus, and Jersey calves.

about the same time, reared on the mother, and grazed similarly on a rotational plan. Both groups of crossbreds have been gaining from 10lb. to 12lb. per week. If this gain is maintained, carcasses of 450lb. to 500lb. should result by the end of this summer at 18 months of age. If so, they should qualify for the chiller-quality beef premium and the stock should be worth approximately £30 per head on the farm.

Everything points to this result being obtained. The animals are of very promising beef quality, showing many of the characteristics of the Aberdeen Angus. Fig. 7 shows a typical crossbred runner at 8 months, with an average Aberdeen Angus and an average Jersey at the same age.

Though any arguments advanced as to the practical and economic future of either of the two systems described must be highly speculative, at present a few comments seem worth making.

First, it is probable that much of the adverse popular opinion against the Jersey as a source of beef is largely prejudice arising from the fact that most of such beef used in New Zealand is from straight elderly Jersey cows which have passed the stage at which their meat is palatable. In suggesting that the Jersey may play a useful part, the author is thinking of half-bred Jerseys graded up in meat quality by a specialised beef breed, and of young crossbred carcasses, rapidly fattened on fattening-quality pastures. If such cattle are handled under these conditions, there is at least a very good chance, judged from the way Ruakura animals are shaping, that they will provide better beef for either the local or export trade than even straight beef types that have grown elderly on sparse hill-country pastures. It is considered that this much-despised cross could contribute substantially to the building of a large-scale and highly profitable export trade in chiller-quality beef.

The idea of producing and eating beef with a dairy-type origin on one side does not disturb an Englishman. At least half of the beef produced in Britain is of this type, and current methods there aim at an increasing exploitation of such stock through artificial breeding with beef bulls on dairy herds.

There is obviously tremendous scope for similar work in New Zealand. With 2,000,000 dairy cows available, 600,000 to 800,000 could be mated to beef-type bulls and still leave enough to provide straight dairy-type females for herd replacements. Obviously, if the agricultural policy of the Dominion proceeds along the lines of greater diversification and more beef production, future increases in production from grassland could well exploit the beef potential of these cows.

Fig. 7—A typical 8-months-old crossbred compared with an average Jersey and an average Aberdeen Angus of the same age.

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Manuka Blight

Scale Insects Associated with Manuka Species in New Zealand

By J. M. HOY, Department of Scientific and Industrial Research Entomological Research Station, Palmerston North

AN apparently introduced scale insect of the genus *Eriococcus* has been artificially established throughout both islands of New Zealand within the past 10 years. The insect is associated with both red manuka (*Leptospermum scoparium*) and white manuka or kanuka (*L. ericoides*). Infested plants show a heavy coating of black fungus on the lower leaves and stems. This combination of fungus and insect, known colloquially as manuka blight, is associated with the death of red manuka but not of white manuka. The writer concludes that the insect causing "manuka blight" is now so well distributed that if further artificial transfer were stopped, it is probable that the insect would continue its natural spread into all sizeable areas of manuka. The insect's effect on red manuka affords the most spectacular example of biological control of a plant yet seen in this country.

THE majority of the coccids (scale insects) associated with manuka (*Leptospermum*) species in New Zealand were described by W. Maskell (1887) in the period 1882-84; the locality records were limited and apparently none of the species was considered to be of economic importance. Little work on the coccids of manuka was done between that time and 1945. Extensive surveys of the coccid complex associated with manuka were carried out by Sewell (1949) and Hoy (1949). These surveys have been continued up to date. It is now possible to present a clearer picture of the distribution of the known coccids and to summarise the current information on two apparently introduced species of the genus *Eriococcus*.

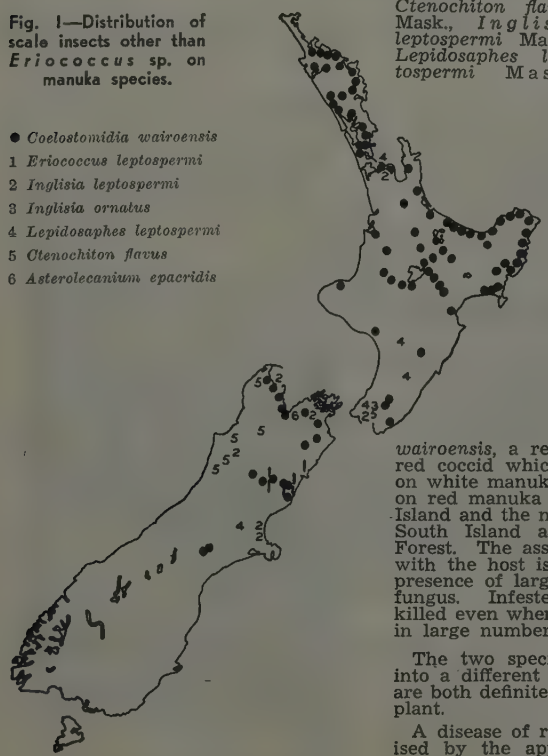

Fig. 1—Distribution of scale insects other than *Eriococcus* sp. on manuka species.

Distribution of Coccids on Manuka

The scale insects recorded by Maskell may be listed in order of frequency of occurrence as follows: *Coelostomidia wairoensis* Mask., *Ctenochiton flavus* Mask., *Inglisia leptospermi* Mask., *Lepidosaphes leptospermi* Mask., *Inglisia ornatus* Mask., and *Asterolecanium epacridis* Mask. The known distribution of these insects is shown on the accompanying map (Fig. 1).

These coccids are relatively confined in distribution and apparently innocuous to the host plant. It will be seen from Fig. 1, however, that one notable exception to this comparatively restricted distribution is *C. wairoensis*, a relatively large orange-red coccid which is commonly found on white manuka and to a less extent on red manuka throughout the North Island and the northern portion of the South Island as far south as Peel Forest. The association of this insect with the host is characterised by the presence of large amounts of a black fungus. Infested plants are rarely killed even when this insect is present in large numbers.

The two species of *Eriococcus* fall into a different category in that they are both definitely harmful to the host plant.

A disease of red manuka characterised by the appearance of a heavy growth of sooty mould on the infected plants was noted in the upper Orari Gorge about 1937. By 1945 a considerable portion of the manuka in the Geraldine district had been killed. Investigation showed the presence of an eriococcid (referred to in this article as *Eriococcus* sp.). A survey by Sewell (1949) showed distribution of this new species in Canterbury from Fairlie in the south along the foothills to the Okuku Range near Amberley. The majority of isolated manuka stands on the Canterbury Plains were also infested. No insects were reported from the North Island. Hoy (1949), however, recorded the presence of this species at Tangoio (near Napier), and Wairoa. These areas had been artificially infested with insects from the Geraldine district between 1945 and 1946. Today *Eriococcus* sp. has been transported artificially to many other localities and is established widely throughout the North and South Islands, the range being from south of Lake Manapouri to Kaitaia.

In Canterbury *Eriococcus* sp. has become established, largely by natural spread, over 4½ million acres. In the Wairoa area, partly by natural spread from the introduced infestations at Tangoio and Waihi (Wairoa County) and partly by artificial distribution, the area of infestation has grown from approximately 60 acres in 1945 to 1½ million acres today. In North Auckland there are now two large areas infested, one in the Kaitaia-Kaikohe region of approximately 850,000 acres and another near Warkworth of 25,000 acres. On the west coast there is

Fig. 2—Distribution of *Eriococcus* sp. on manuka species.

The darkened areas are those where the species is established.

Dots indicate infestations which are not yet extensive.

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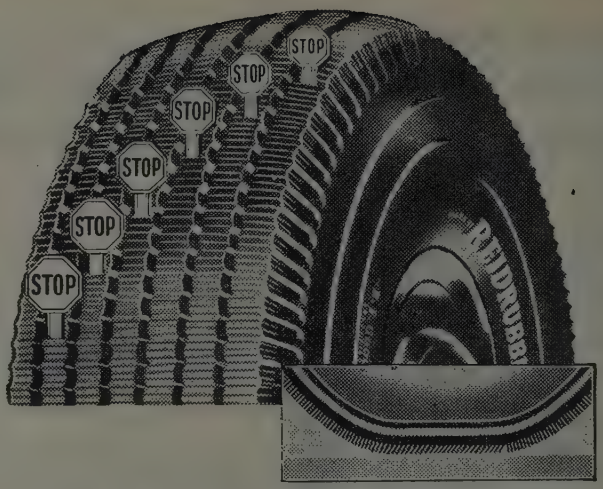

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an area of 100,000 acres near Raglan and another of 10,000 acres at Kawhia. These figures do not imply that the whole of these areas is occupied by manuka, but within these districts it is difficult to find a stand of any size which is not carrying the insect.

Taken together these areas represent approximately 11 per cent. of the land area of the main islands. Other areas from which *Eriococcus* sp. has been recorded are shown in Fig. 2. In the areas indicated by a dot on the map the infestation is not yet extensive, though in some places the rate of spread is increasing rapidly. The only large tract of manuka in the North Island from which the insect has not been recorded lies between Lake Taupo and the coast at Opotiki. The distribution shown on the map is by no means complete, but it does show that the insect is capable of establishing under a wide range of climate.

A second species of *Eriococcus* (*leptospermi* Mask.) was recorded by Hoy (1953). Its distribution is still relatively confined in the area between Hanmer, the mouth of the Conway River, and Kaikoura (Fig. 1). This species was described by Maskell (1890) from red manuka and *Leptospermum laevigatum* in Australia. Its occurrence in an isolated locality in New Zealand is difficult to explain. *E. leptospermi* is apparently capable of killing red manuka in New Zealand. Unfortunately the locality in which it occurs has been overrun by the other eriococcid species (*Eriococcus* sp.), which makes the study of *E. leptospermi* as a separate entity rather difficult.

Appearance and Habits of *Eriococcus* sp. and *E. leptospermi*

Plants of both red and white manuka infested with *Eriococcus* sp. show a heavy coating of a black fungus on the lower leaves and stems. This fungus, which was identified as *Capnodium walteri* Sacc. by Mulcock (1954), does not penetrate the plant tissue and is dependent on the continued production of honey dew by the insect. Scattered on the surface

Female of *Eriococcus* sp. (highly magnified).

Above—Male of *Eriococcus* sp. (highly magnified). Below—Crawlers of *Eriococcus* sp. (highly magnified).

of this "mould" are small white flecks, the cocoons of the male puparia. When the outer covering of fungus and loose bark is removed, the females and immature stages of the insect can be seen.

The female is sheltered within a greyish white sac; once fixed to the plant by its rostrum the female remains in one position. The female is about 1/25in. long and is discernible to the naked eye. The male is the only winged stage, small and inconspicuous apart from its two ample iridescent wings and a pair of long waxen caudal filaments. The nymphal stage or "crawler" is somewhat like the female in appearance, but is smaller and moves about.

The female and crawler of *E. leptospermi* resemble those of *Eriococcus* sp., but the two insects may be separated on the host plant, as the sac of the female of *E. leptospermi* is always exposed, whereas that of *Eriococcus* sp. is hidden beneath the exfoliated bark.

Eriococcus sp. has one generation per year under Canterbury conditions, crawlers being found free on the plant in maximum numbers during the 6 weeks from mid-April. Dispersion of the insect occurs during the nymphal period. Under natural conditions the most active spread is by wind-borne crawlers. Spread is therefore more rapid with the prevailing wind than against it. Numerous examples of the effect of wind on the rate of spread may be seen in the Wairoa area.

The establishment of this insect appears to be little affected by either altitude or climate. Scattered manuka plants in the high valleys of the Southern Alps are heavily infested, as are small heath-like plants growing on exposed ridges at altitudes of approximately 3000ft. In the North Island plants have been infested at altitudes higher than 2500ft. Where the degree of exposure is severe the rate of build-up of the insect is slowed down and plants survive longer from initial infection.

Place of Origin

The origin of *Eriococcus* sp. remains obscure. The insect is not known to entomological institutions overseas and though Australian authorities place it close to *E. leptospermi*, it differs from that species in a sufficient number of characters to warrant specific status. *E. leptospermi* appears to be an introduction which can be traced back to its original habitat, but it is difficult to explain its occurrence in an isolated

Kanuka (*Leptospermum ericoides*) surviving in a stand of manuka (*L. scoparium*) killed by *Eriococcus* sp.

area such as the Conway River valley. Similarly *Eriococcus* sp. was first noted in an isolated area, the upper Orari Gorge. It is possible that these insects were accidentally introduced on ornamental varieties of manuka, but such explanation would not account for their presence in the remote areas in which they were first recorded.

Effect of *Eriococcus* on Host

A stand of red manuka infested with *Eriococcus* sp. may be distinguished by the blackened appearance of the lower portions of the plants, only the canopy foliage retaining its normal green. Plants carrying high populations of the insect sometimes show accelerated tip growth for a short time before death. The first symptom of approaching death of the plant is the gradual browning of the canopy foliage. This normally occurs at a time of changing ecological conditions, such as the lowering of the soil moisture level or the onset of frosts. Once death ensues defoliation is rapid and only the skeleton of the plant remains until the roots decay. From 3 to 5 years elapse between initial infestation and death and usually 2 to 3 years between death and the collapse of the plant.

When heavily infested plants are sprayed with insecticide and the insect is eliminated the plants recover and continue to grow normally. This indicates that no plant virus is involved. Death of the plant may be due to direct insect feeding, to the production of toxins, to reduction in photosynthetic activity due to the presence of sooty mould, or to any combination of these factors. Experimental work along these lines is now proceeding. This much is certain; the insect is primarily responsible for death of the plant, since the fungus (associated with *Eriococcus* in manuka blight) is dependent on the continuing production of honey dew by the insect for its existence.

The relative immunity of white manuka is difficult to explain. This plant is readily attacked by *Eriococcus* sp. and though the population density of the insect reaches high levels, very few plants are killed.

This *Eriococcus* sp. has not been recovered from any plants other than red and white manuka, but other plants growing close to infested manuka are sometimes coated with black fungus growing on honey dew dropped from the infested plant.

Spread and Control Sprays

Within the space of 10 years *Eriococcus* sp. has been artificially established throughout both islands. It is now so well distributed that if all further artificial transfer were stopped, it is probable that the insect would continue its natural spread into all sizeable areas of manuka. A discussion on the wisdom of using such an agent against an important member of New Zealand's indigenous flora is outside the scope of this article.

One fact is clear: The effect of this insect on red manuka affords the most spectacular example of biological control of a plant yet seen in this country.

The insect may be controlled with oil emulsions or a spray consisting of either 50 per cent. para para isomer wettable D.D.T. or 10 per cent. gamma B.H.C. nicotine sulphate, and a wetting agent in the proportions 8 : 1 : 8 in 800 parts of water. Such sprays, though useful for specimen plants or small stands, would be neither feasible nor economic on a national scale.

Lack of knowledge of the *Eriococcus* species overseas suggests that in its original habitat it has been kept in check by natural enemies. A search could be made for these parasites or predators, but this may easily be long and expensive.

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Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given during January as follows:—

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8.5 p.m., Wednesdays at 8.1 p.m. (Northland stock market report), Fridays at 8.1 p.m.

1YA Auckland, Mondays, Tuesdays, Wednesdays, Thursdays, Fridays, 7.45 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m. (Pig Council talk on fourth Wednesday of every other month), Thursdays at 12.33 p.m. and 7.15 p.m. (fortnightly).

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report), Thursdays at 8 p.m.

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3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

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Water Hyacinth is a Dangerous Weed

By C. WALKER,
Assistant Fields Superintendent,
Department of Agriculture,
Palmerston North

Above—Water hyacinth has the reputation of being the world's fastest growing water plant. In suitable conditions it rapidly forms a bank to bank cover. Below—An extensive growth of water hyacinth in a small pond near Shannon. A few plants introduced 2 or 3 years ago have produced a growth which has now spread completely over the pond.

WATER hyacinth, one of the world's most rapid growing plants and capable under suitable climatic conditions of completely covering lakes and waterways with a dense growth of roots and leaves, is well established in some ponds, lagoons, and waterways in the North Island.

THOUGH doing little or no damage in some areas where it has been found, it has proved to be very dangerous when it has escaped into streams running from ponds and thus into bigger waterways, where it has given considerable trouble by stopping the free flow of water.

Growth near Shannon

An extensive growth of water hyacinth has recently been found in a small pond near Shannon. A few plants introduced 2 or 3 years ago have produced a growth which has now spread completely over the pond. The water from this pond runs into a stream which eventually flows into the Manawatu River, and there is great danger of water hyacinth getting into these waterways, where it would be extremely costly to eradicate.

When repeated sprayings failed to eradicate water hyacinth in this pond near Wairoa it was decided to attempt control by drainage. When this photograph was taken the water level had been lowered several feet, but there was still a considerable amount of water hyacinth growing among the rushes and sedges.

Difficulty of Eradication

The plant is really difficult to destroy. A very small bit left unkilled is capable in a very short time of producing growth covering extensive areas of water. The difficulty experienced during the past 3 years in cleaning out water hyacinth from small ponds, lagoons, and creeks in various places in the Auckland and Poverty Bay districts gives an indication of what the position would be if the plant became established in the slow-flowing parts in some of the main rivers such as the Northern Wairoa, the Waikato, the Waipaoa, and the Manawatu. If these rivers became infested with water hyacinth, a permanent rise in the water levels in their lower reaches would hinder the drainage from many thousands of acres of land and also cause more frequent flooding. For this reason the Department of Agriculture has acted to have the plant recognised as a very dangerous noxious weed and also to attempt eradication wherever it is found.

Experience at Wairoa

Of interest in this connection is the work required to get rid of the weed from a small pond near Wairoa. Water hyacinth is easily killed with the amine salts of 2,4-D at 4lb. acid equivalent per acre. It is not so easy, however, to apply the spray to every plant over several acres of water when much of the pond has soft, muddy banks and there are big areas of dense raupo and niggerheads. Every season for the past 3 years small colonies of plants missed in the annual spraying have grown again and multiplied at an amazing rate. The main reason for the poor control is that the water hyacinth in the pond is setting viable seed. Seeds germinate on the bottom and are protected by several inches of water from the hormone sprays. No pond where seeding is occurring has yet been cleared up by hormone spraying. Even when the bank at the end of the pond was cut through and a drain carried up into the old creek bed water hyacinth still persisted in any wet patches, enough being left to re-infest the pond if it was filled again with water. It has been decided that the only way to get rid of the plant is to drain the area completely and sow it to grass. This means, of course, the loss of the pond as a good stock water supply.

The infested pond at Shannon, though a water-supply pond, will probably have to be dealt with in the same way. The fact that water hyacinth has produced viable seed in New Zealand suggests there is a danger of this plant spreading to important drainage waterways, where its control would be very costly. Farmers and others should watch for this plant in creeks and ponds, and on no account should it be planted anywhere.

Short-rotation Ryegrass on Manawatu Hill Country

THOUGH short-rotation ryegrass has proved of great value on many well-managed dairy farms on low country, little information has been available regarding its performance at fairly high altitudes.

To secure this information a trial was laid down in 1950 at Table Flat, Apiti, in the Manawatu district, on a fairly fertile soil at an altitude of 2400ft. above sea level. On this country there are prolonged periods of cold, wet weather during winter and occasional light falls of snow. Summer rainfall is usually ample for plant growth, though conditions are sometimes dry in late summer.

The trial consisted of a comparison of the latest and earlier selections of short-rotation ryegrass, perennial ryegrass, and Italian ryegrass. The mixture sown contained 30lb. of ryegrass, 3lb. of white clover, and 4lb. of cowgrass. In addition a seeding of 20lb. of short-rotation ryegrass was compared with one of 40lb.

It was found that under these conditions short-rotation ryegrass has a fairly low winter production, but that it produces well from early spring to midsummer, though summer production is dependent on adequate rainfall.

The trial showed that to secure the best results from short-rotation ryegrass in this district the pasture must be rotationally grazed and close grazing should be avoided. The latest strains of short-rotation ryegrass were slightly more persistent than were the earlier ones. The trial showed that a mixture of short-rotation ryegrass and perennial ryegrass gave better ground cover than short-rotation ryegrass on its own. Increasing the rate of seeding from 20lb. to 40lb. did not result in a better pasture. It was also found that Italian ryegrass was not as satisfactory as short-rotation ryegrass.

The trial has shown that the use of short-rotation ryegrass is warranted on high altitude dairy farms in the Manawatu district and that it should be included in any general mixtures for this type of country where top-dressing and rotational grazing can be practised regularly. A recommended seed mixture for such country is 20lb. of perennial ryegrass, 10lb. of short-rotation ryegrass, 3lb. of white clover, 3lb. of cowgrass, 4lb. to 6lb. of cocksfoot, and 2lb. to 3lb. of timothy, certified seed being used in each case.

—*J. A. GRAHAM,*
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CHANGES OF ADDRESS OF "JOURNAL" SUBSCRIBERS

To ensure continuity of delivery of issues of "The New Zealand Journal of Agriculture", subscribers are required to give 4 weeks' notice of change of address. The old address (preferably an address label clipped from a recent "Journal" wrapper) and the new address should be sent to the nearest office of the Department of Agriculture.

The National Hybrid Sow

TWO years ago the National Pig Industry Council decided to invest money in the pig section of the Department of Agriculture's Ruakura Animal Research Station to establish a pilot breeding plant to produce hybrid sows for distribution to farmers. What the national hybrid sow is, how it is being produced, why it is being produced, and when it will be available for distribution were discussed by D. M. Smith, Research Officer, Department of Agriculture Animal Research Station, Ruakura, in an address, an adaptation of which follows, to this year's Ruakura Farmers' Conference.

NATIONAL hybrid sows are the crossbred progeny of purebred Large Whites and Berkshires. They are first-cross sows and must be mated to purebred boars to produce commercial fattening stock.

How Sows are Produced

It is simple enough to cross two pure breeds. It is just as simple to carry on from there and throw in any or all the other breeds available. Crossbreeding, however, contains no magic. The qualities desired in the crossbred must be possessed in some degree by its purebred parents. The basis of the national hybrid sow is, therefore, tested and proven purebreds.

The breeding centre has purchased a number of pedigree Berkshires and Large Whites from studs throughout New Zealand. These animals have been mated and will be discarded or kept, together with their progeny, according to their performance.

First, sows are mated to boars of their own breed. They must farrow litters of at least 7 pigs in their first litter or 8 in subsequent litters. These litters at weaning must weigh 250lb. for first litters and 320lb. for subsequent litters. After weaning these purebred progeny must grow rapidly and gain weight economically. Sows which do not fulfil the requirements laid down will be discarded. Similarly the litters which fail to come up to standard will be slaughtered. Those that qualify will be used for future breeding stock.

The sows that produce satisfactory litters will then be mated to produce crossbred progeny and the sows from these litters will be sold under the name of national hybrid sows. The performance records of these hybrids on the farm will be kept and will provide additional information on the purebred strains to be kept at the breeding centre.

The aim, therefore, is not simply to produce crossbreds. It is to produce a cross from two proven purebred animals.

Why Sows are Being Produced

Most farmers are aware of the low productive efficiency of the pig industry. The writer believes that New Zealand could have the most efficient pig industry in the world, but not while sows farrow on average only 9 pigs per litter. Nor can the industry be efficient when sows farrow only 1.5 to 1.8 litters per year (and farrow them more or less evenly throughout the year) and while 30 per cent. of the pigs born die before weaning. These factors add up to an inefficient industry which markets less than 10 pigs per sow each year.

The first step is to produce sows that, ideally, will have a fair chance of producing litters of 12. The second step is to give the farmer the information that will enable him to provide these sows with the facilities and management necessary to rear their pigs. This second step depends on efficient research and extension services and will be dealt with later.

It is believed that hybrid sows bred in the way outlined have a good chance of satisfying the first requirement of large litters.

A question often asked is: "Why not try to produce a purebred sow for the farmer rather than a crossbred?"

Two reasons for the adoption of a crossbreeding policy are:—

The New Zealand farmer's sow is a farm pig not a stud pig. The fact that 80 per cent. of the pigs in New Zealand today are crossbred and that this has been the position for 20 years suggests that the purebred pig has not satisfied farmers' demands.

There is ample genetical evidence that the phenomen called hybrid vigour is a real force in animal and plant breeding. It is an advantage simply gained and it would be foolish for any commercial farmer who depends

HEADING PHOTOGRAPH: National hybrid sow and litter.

Porker weight progeny of national hybrid sow. These pigs were sired by a Large White boar to produce white pigs for the export trade.

for his living on the productive capacity of his animals not to take advantage of it.

The national hybrid sow does not, however, discount pure breeding. The aim in producing these animals is to use the qualities possessed by two pure breeds by combining them in one animal for use by the farmer. This policy recognises that differences exist between breeds, apart from coat colour, and that the combining of these qualities will give a superior animal.

There is ample genetical evidence to support the practical use of hybrid vigour. The example of hybrid corn in the U.S.A. is known to most farmers. In the last 10 years some of the principles involved in the production of modern corn have been applied to pigs. At Minnesota Professor Winters has demonstrated successfully the planned use of inbreeding and crossbreeding for increasing pig productivity.

Winters's work had two main aims. The first was to establish breeds producing less lard than the breeds at present used in the U.S.A. The American breeds such as the Duroc Jersey, the Chester White, the Hampshire, the Poland China, and the Berkshire were bred and selected to convert large quantities of corn into fat. These pigs can no longer satisfy the changed demand, which is for lean cuts.

The trend, therefore, has been to establish new breeds which are long and lean though possessing all the other productive qualities required. Several new breeds have been developed, such as Minnesota No. 1 (based on the Danish Landrace and the Tamworth), Minnesota No. 2 (based on the Canadian Yorkshire and the Poland China), Montana No. 1 (based on the Hampshire and the Landrace), Beltsville No. 2 (based on several breeds, including the Landrace, Yorkshire, Duroc, and Hampshire), and Minnesota No. 3 (based mainly on the Gloucestershire Old Spots and the Welsh).

Once the original crosses are made the crossbred progeny are interbred and inbred and intense selection is practised. Selection is based entirely on production records, so that a breed is formed that possesses prolificacy, rearing ability, good growth-rate, and feed conversion efficiency. These breeds are then crossed to make use of hybrid vigour in the production of commercial pigs.

Similarly, by the crossing of Large White and Berkshire, the national hybrid sow is being developed for use in the New Zealand industry as the mother of commercial pigs. The purebred stock used in the cross will be selected on their performance qualities.

The final recommendation of the Minnesota research workers is a three-breed, rotational cross. In this system Minnesota No. 1 and No. 2 are crossed. Sows are selected from the crossbred progeny and mated to Minnesota No. 3. Sows are again selected from these three breed progeny and mated to Minnesota No. 1, and the breeds are rotated indefinitely in this manner.

At Ruakura the Tamworth is being tried as a sire across Berkshire-Large White hybrid sows. The resulting litters will be farrowed and reared at Massey Agricultural College under standard feeding conditions in an attempt to assess the crossing ability of the Tamworth as the third member of the system.

Distribution of Sows

The first batch of national hybrid sows has been made available to Massey College and to a few farmers this year. As larger numbers of proven purebred stock become available at the breeding centre the supply will increase. However, the scheme is in the experimental stage. The main task at present is to breed satisfactory purebreds and test their crossing ability. Accordingly the first lots of hybrid sows available for distribution must be regarded as test lots rather than the finished products.

Hybrid sows will be distributed through the district pig councils. Distribution is a function of extension services rather than of research, but more important, the distribution of good commercial stock is probably the ideal method of introducing farmers to improved housing and management.

Control of Grass-grub and Porina Caterpillar

TWO important pests of pasture, the grass-grub (*Costelytra zealandica*, formerly called *Odontria zealandica*) and the porina caterpillar (*Oxycanus*), can both be controlled by the application of D.D.T.

The grass-grub does all its damage underground by eating the roots of pasture plants. The pasture browns off in patches and the turf can be pulled up. The porina, on the other hand, remains underground during the day, but emerges at night to graze the leaves of grasses and clovers. Grazing is so hard and constant that plants are quickly killed. Farmers should be suspicious of porina damage in pastures where autumn growth appears to be slow.

Treatment

Recent work by the Entomological Research Station of the Department of Scientific and Industrial Research confirms earlier recommendations about treatment for both pests. Two pounds of 100 per cent. para para isomer of D.D.T. or its equivalent (for example, 4lb. of 50 per cent. p.p.i. of D.D.T.) should be applied per acre, preferably with superphosphate as the spreading agent. If ready mixed D.D.T. superphosphate is used, the required quantity of D.D.T. is contained in 1½cwt. of the ordinary mix (D.D.T. superphosphate) or in 1cwt. of D.D.T. special mix. Alternatively, the farmer may purchase the D.D.T. powder and mix it himself by turning it in a concrete mixer for 3 minutes at 25 r.p.m.

Treatment will give protection against grass-grub for 3 years and against porina for 2 to 3 years. It may be applied at any time of the year, but for porina February-March application is most satisfactory. All trash, headed straw, etc., must be removed from the surface and the pasture must be hard grazed and dry before application. Even distribution is best obtained with a drill with coulters removed or with a box-type topdresser. "Spinners" are not advocated; nor is aerial treatment if better methods are available.

—*C. P. WHATMAN,*
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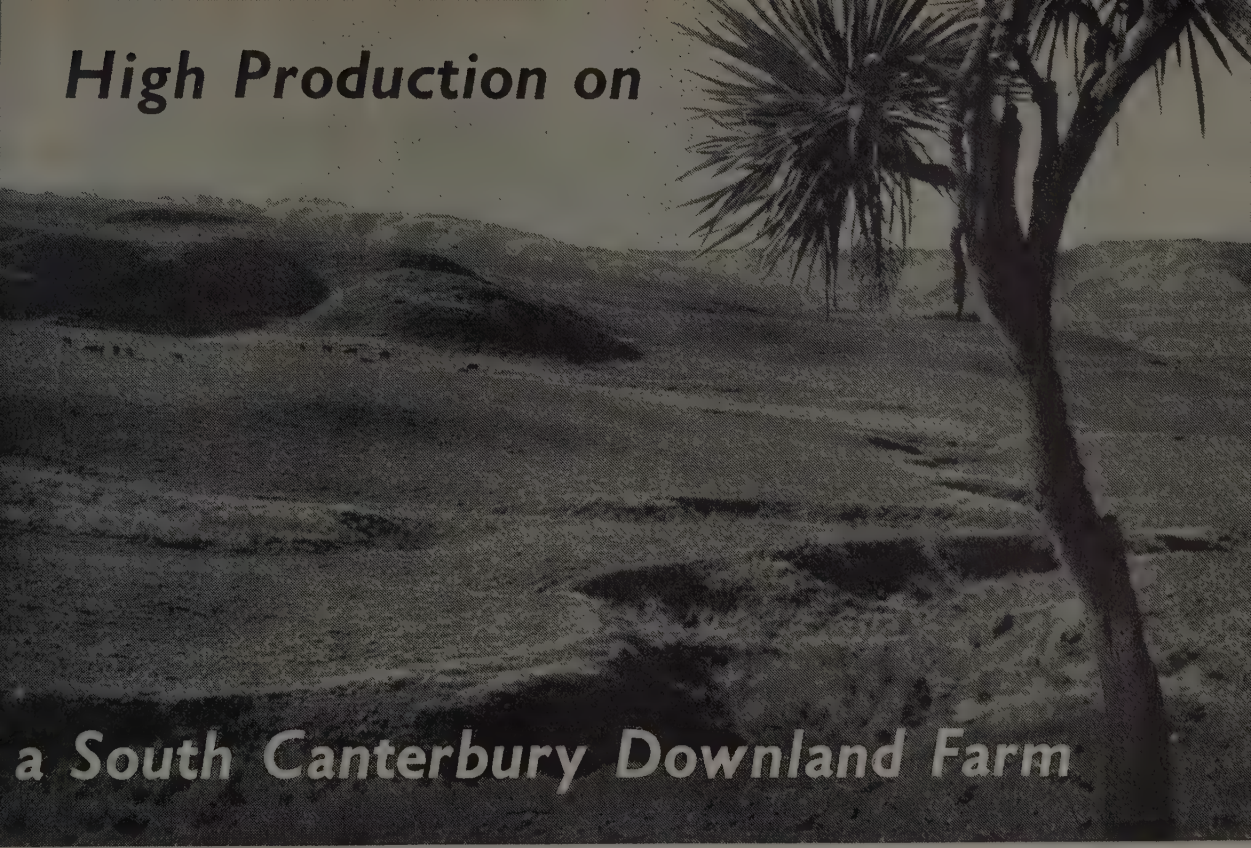
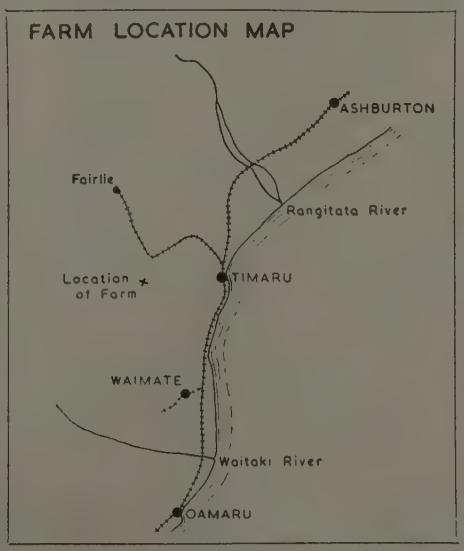
Ashburton

High Production on a South Canterbury Downland Farm



IN a report of a survey of the South Canterbury foothills region in the "Journal" in August 1954 the statement was made that the region has been South Canterbury's marginal area but is now one of the main areas in the district where increased production can be expected. In this article H. Tocker, Research Officer, Department of Agriculture, Christchurch, describes the methods adopted by a father and son in developing and managing this class of country and the results which have been achieved.

MR. D. G. BAKER is farming 1183 acres of clay downland in the Maungati-Cannington district about 17 miles west of Timaru. The farm is typical of the South Canterbury foothill country in that it has similar soil types and has had a history of excessive cropping. The first block of 395 acres was purchased by Mr. Baker's father in 1919, in 1939 an additional 432 acres of tussock land was leased and subsequently purchased, and in 1943 a further block of 356 acres alongside the original holding was acquired. Mr. Baker, sen., has retired and Mr. D. G. Baker has managed the property since 1948.



Development

When the original 395 acres was acquired it had no internal fences, but only a house and a dilapidated stable. Though the property had been excessively cropped in the past, for the first 9 years of his occupation Mr. Baker continued with a modified cropping programme, reducing the annual wheat acreage to about 100 acres. In addition he grew some barley or linseed as well as oats for the team of horses and turnips for the flock of 300 crossbred ewes. Under this system of management no headway was being made and in 1928 he decided to change from cropping to purely pastoral farming.

With the adoption of a vigorous liming policy good pastures have been established on the homestead area of 750 acres, 180 acres of the tussock block have been giant disced and also sown to improved pasture, and it is intended that in the next 2 years as much of the remaining 250 acres of this block as can be covered by a tracklaying tractor will be similarly developed. The homestead area is well subdivided by good 7-wire fences with well-hung gates and a water supply system, including large concrete tanks holding 6000 gallons, has been installed. This supplies water to every paddock on the 750-acre block as well as the house, shearing shed, and dip. A 2-stand shearing shed and yards and a large shed which houses a full range of implements as well as two wheeled tractors and one tracklaying tractor have been built. Two large Dutch barns have also been constructed for the annual supply of 6000 bales of hay. Several miles of shelter

HEADING PHOTOGRAPH: Typical rolling country on the farm.

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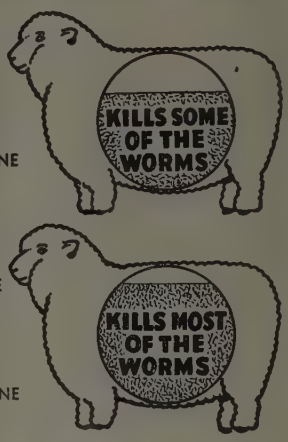

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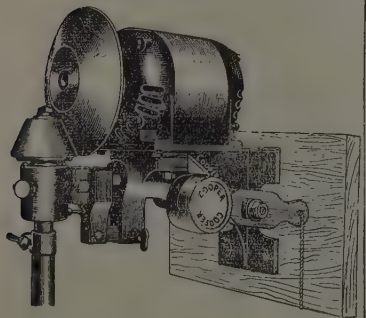

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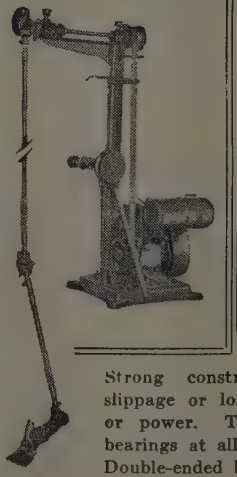

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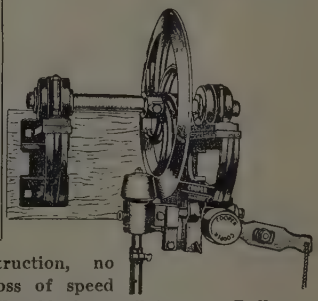

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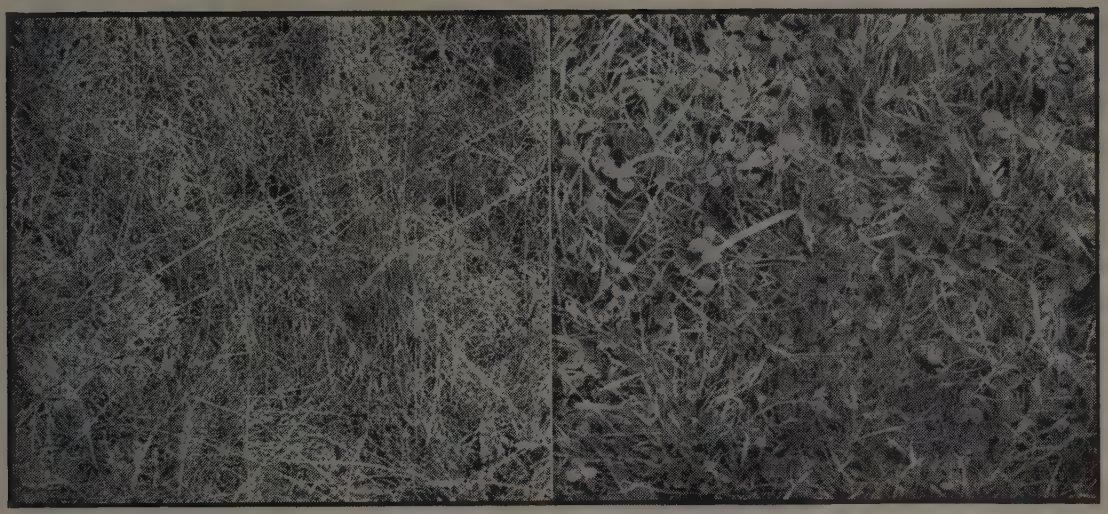


It has been shown on this farm that highly productive pastures can be established on the clay downs and that by good management they will remain productive for a number of years. Left—An unimproved pasture. Right—An improved pasture.

belts, mainly pines, have been planted to give shelter from the south-west and north-west winds.

Supplementary Crops

Though swedes, turnips, rape, and greenfeed were grown in the past as part of the normal programme, this is not done today. Rape is grown only if a dry spring has affected pasture growth, and then the poorest paddock is ploughed and worked as early as possible and sown to rape. After the rape has been fed off the paddock is usually worked and drilled in Italian ryegrass (20lb. per acre) and Imperial Green Globe turnip (14oz. to 16oz. per acre) for winter feed. The paddock is then summer fallowed preparatory to being regrassed the following autumn. It is not usual to grow turnips or swedes for winter feed, the stock usually being wintered on greenfeed, young grass, and hay.

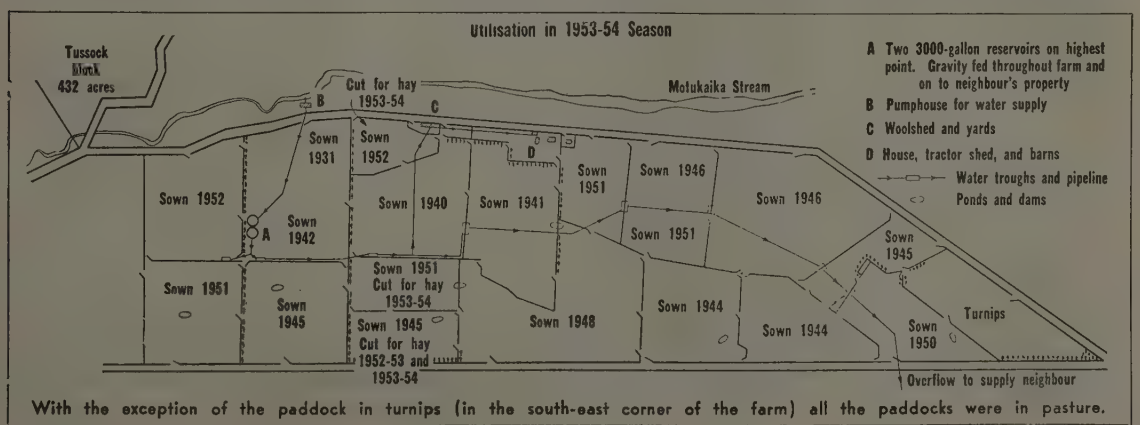
Pastures

It has been shown by these farmers that highly productive pastures can be established on the clay downs and further that by good management they will remain productive for a number of years. This is illustrated by the number of paddocks which have been down to pasture for over 7 years and are still highly productive.

The farming system practised in the early years of occupation required that almost one-third of the farm be under the plough each year, and the area in new grass varied between 80 and 100 acres. Under such short rotations it was impossible to build up fertility sufficiently to establish good pastures. Also it was customary to sow grass with turnips. The turnips were break-fed in winter, but the paddocks pugged up so badly that new pastures were seldom very successful and quickly reverted to browntop and sweet vernal.

In his early attempts to establish good pastures Mr. Baker used burnt lime and potash, but this was not successful. However, the first pasture sown down in 1929 with agricultural lime established well and was maintained with further dressings of lime and superphosphate. One pasture was sown down in 1931 under this method and is still producing excellent feed.

As there are usually no crops grown on the farm, there is no set rotation for pasture renewal, but when it is necessary to renew a paddock it is usual to plough out of lea and sow to turnips and Italian ryegrass for winter or spring feeding, follow with a summer fallow, and then sow to pasture. Land to be resown to permanent pasture is always summer fallowed and sown down toward the end of February. Usually a ton of lime and 2cwt. of superphosphate per acre are



With the exception of the paddock in turnips (in the south-east corner of the farm) all the paddocks were in pasture.

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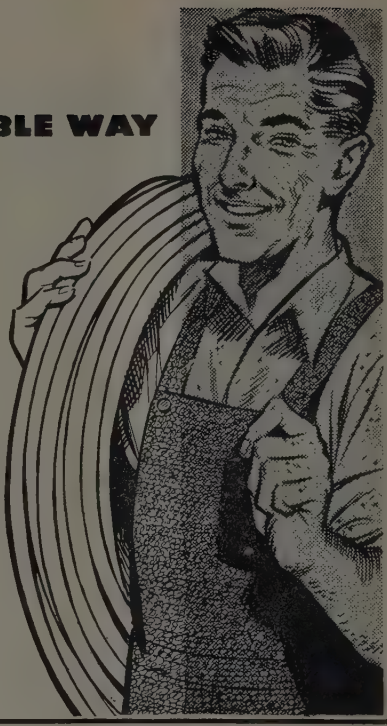

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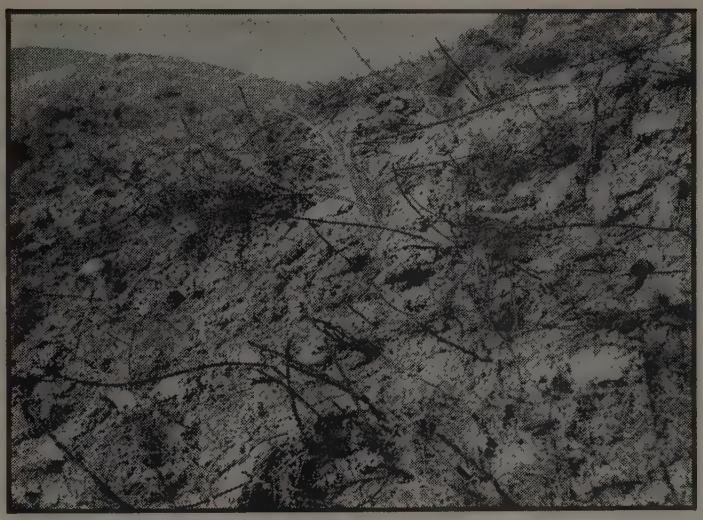
sown and worked into the ground before sowing. The pasture seed mixture is broadcast behind the roller and lightly covered with grass harrows. The pasture mixture used comprises:—

10lb. of short-rotation ryegrass
15lb. of perennial ryegrass
5lb. of cocksfoot
2lb. of timothy
2lb. of white clover
2lb. to 3lb. of Montgomery red clover
2lb. of crested dogstail

All the perennial ryegrass seed used since 1930 has come from very old pastures in the Waikari district in North Canterbury.

Pasture Management

No seed crops are taken off any of the pastures. New grass paddocks are grazed as early as growth permits, though care is taken to see that early grazing is not too severe and is just sufficient to check the faster growing grasses and enable clovers to establish. In the first spring young grass paddocks are set aside for lambing-down and carry ewes and lambs at 3 ewes per acre. At no period are pastures allowed to run to the seed-head stage. Heavy stocking with cattle and sheep is used to control growth, but in exceptional growing seasons the mower has been used for topping. In one such year all the pastures were topped twice. About 250 cattle are wintered annually, but as spring growth begins to get ahead, more cattle are brought in to cope with the surplus feed. In the spring and early summer of 1953 the farm was carrying 2800 ewes with 3600 lambs, 110 breeding cows with calves, and 540 other cattle. Even this heavy stocking was insufficient to control adequately the rapid growth and 63 acres were closed for hay.



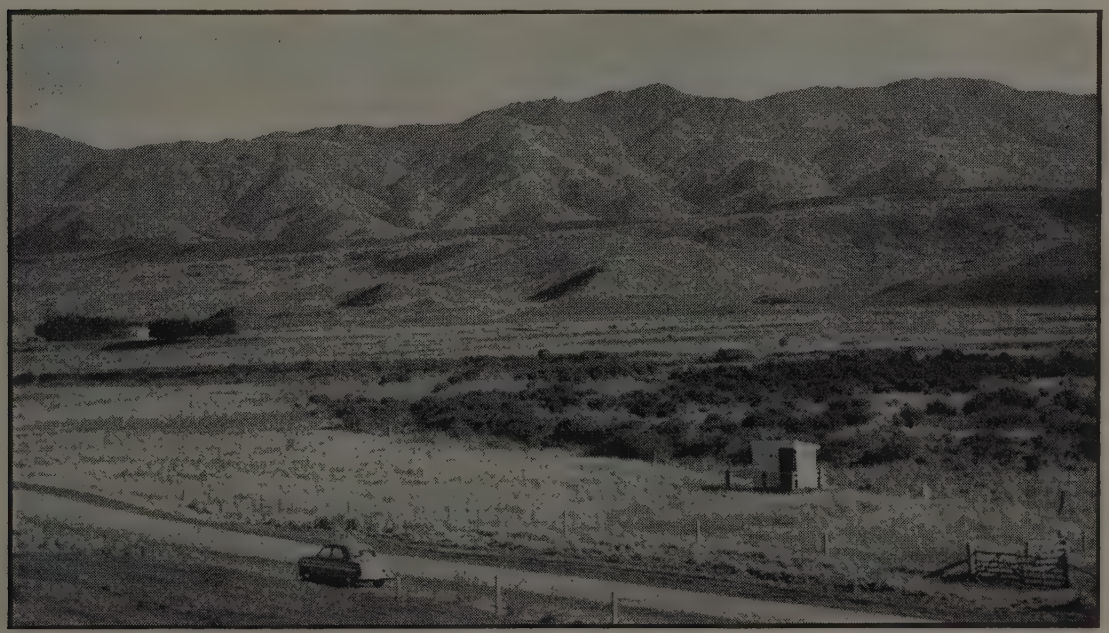
Part of the tussock block which has been cut with discs. Of this block's 432 acres 180 acres have been giant disced and sown to pasture.

Usually a considerable area is closed for autumn-saved grass and reserved for winter and early spring feeding and lambing down. In 1953, 180 acres of 1-year-old grass on the tussock block were closed in January and wintered 110 in-calf cows and heifers, 110 calves, and 30 young cattle. These cattle were wintered solely on the grass and came through in good condition.

Topdressing and Liming

In the first year after sowing the pasture receives a dressing of 2cwt. of superphosphate and ½ ton of lime per acre and every second year thereafter a further 2cwt. of superphosphate and ½ ton of lime per acre.

In 1952 it was decided to try basic slag instead of lime and superphosphate as annual dressings. In that



Part of the farm. The tussock block is in the middle distance and the water supply pumphouse is in the foreground.

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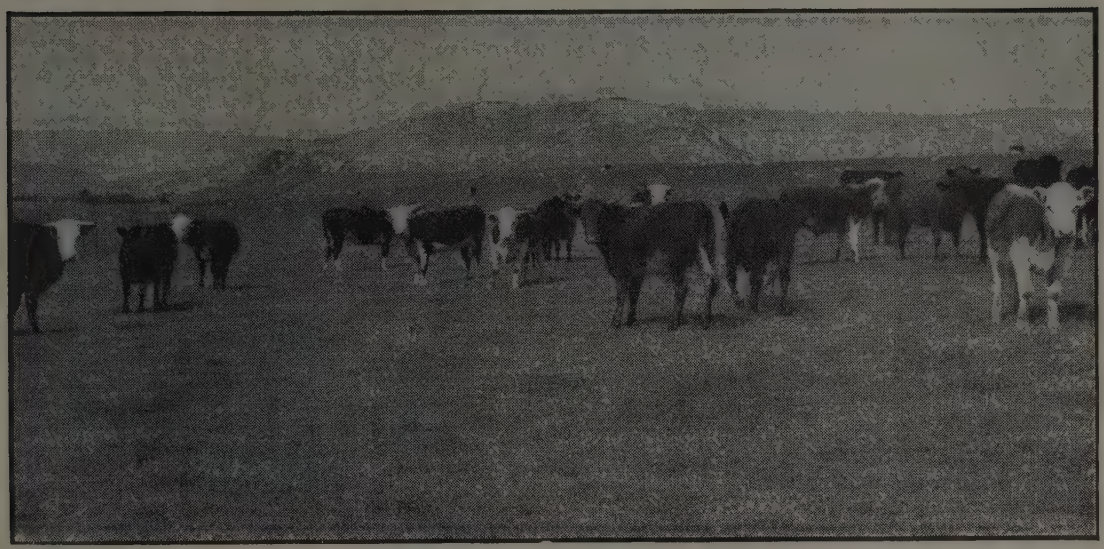

In addition to 110 breeding cows carried, cattle are bought in during spring as the feed position warrants, and by December the farm is usually carrying between 600 and 700 cattle.

year 70 tons of basic slag at 3cwt. per acre were applied; in 1953, 50 tons at 5cwt. per acre were applied, and this year it was intended to apply 40 tons at 5cwt. per acre. As yet there have been no noticeable differences in the amount of feed produced as a result of the change to basic slag.

Stock

In 1929 the area of 395 acres was carrying between 500 and 600 cross-bred ewes and they were not in good condition. Occasionally a few bullocks were brought in to clean up stubble paddocks. The stocking rate on the property at that time was approximately 1½ ewes per acre. By 1939 the stock had been increased to 960 Romney cross ewes and 50 cattle. The sheep were run on the 395 acres of improved land at the homestead and the 50 cattle were all that could be run on the rough tussock block of 432 acres. In 1953 the ewe flock had risen to 2800 Romney cross ewes and the farm was wintering 110 in-calf cows and heifers, 110 calves, and 30 of young cattle. On the whole area of 1183 acres this was equivalent to a little over 3 ewes per acre.

Stock Management

The ewe flock comprises 4- and 5-year-old Romney cross ewes which are bought as cast ewes from nearby hill country stations. About one-third of the ewes are kept for a second season, the remainder being sold either as fats or as cast ewes to fat lamb producers on the plains. The ewes bought in each year are shorn after arrival at the farm and put through the foot-rot bath after the condition of their feet has been checked.

Before tupping, ewes are kept in as hard condition as possible—a difficult task on a farm where feed is so plentiful—and about 2 weeks before the rams go out the ewes are moved on to fresh paddocks. The rams are all Southdowns. Formerly, Ryelands were used, but a change to Southdowns was made about 1950. After tupping, the ewes are kept in good store condition up to June and if turnips and Italian ryegrass have been grown that year, they begin feeding these early in June for about 2 hours a day. However, in many years the stock are wintered solely on autumn-saved grass and hay. Usually 2 hours on turnips and Italian ryegrass or grass are allowed and then the ewes are driven to hay on a run-off paddock. The ample diet and regular exercise keep them in good condition and little sleepy sickness is experienced. It has become a regular practice to inoculate ewes about 10 days before lambing for blackleg and pulpy kidney.

Lambing begins about the middle of August. As the ewes lamb all with twins are drafted and put on to the best available feed at 3 ewes per acre. After tailing, the ewes and lambs are set stocked in mobs of 500 to 600 and are not shifted unless it is absolutely necessary. Usually each mob has the run of 3 or 4 paddocks and pastures are controlled by increasing the numbers of cattle per mob and finally, by closing off a paddock for hay. The ewes are not shorn until the lambs are weaned, which is usually about the middle of the second week in January.

Dosing of lambs is kept to a minimum, only obviously unthrifty lambs being treated. Foot-rot is the most troublesome complaint, particularly in wet seasons, and the ewes are put through the foot-rot bath about every 10 days during treatment and all affected sheep segregated to a hospital paddock for hand treatment. Bluestone is considered most effective and is normally used, though occasionally formalin has been used with good results. During winter the ewes are given free access to a home-made stock lick.

Cattle

Cattle are used on the property to control pasture growth. About 50 breeding cows were bought in 1938

Each of the concrete reservoirs holds 3000 gallons of water. They serve the paddocks on the homestead block of 750 acres as well as the house.

Two Dutch barns, each with a capacity of 3000 bales of hay, have been erected on the property.

and now 110 cows are kept for this. In addition each spring cattle are bought in as the feed position warrants, and by December the farm is usually carrying between 600 and 700 cattle, mainly large bullocks. These are fattened and sold before winter and only the breeding cows and calves are wintered. The calves are fed hay, generally during July and August, and the cows are fed hay for 2 to 3 weeks in August. In the winter of 1953 the cows wintered solely on the 180 acres of new grass on the tussock block and the calves received hay for 1 month only. It is intended to increase the breeding herd of 110 Hereford cows to about 150 head and to breed replacement stock by crossing with Aberdeen Angus bulls. In the past it has been customary to sell the progeny as yearlings, but in future all calves will be kept to 2½ or 3 years old to overcome the difficulty of buying in sufficient numbers of cattle in spring to control pastures.

Production

Revenue on the farm over the last 4 years has been received in almost equal proportions from the sale of beef cattle, wool, fat lambs, and sheep.

About 450 to 550 cattle are fattened each year and about 120 calves or yearlings are sold. The wool sold each year is between 80 and 90 bales and the average clip is about 10lb. per head. In addition, between 450 and 500 ewes are sold fat to the works and about 1100 to 1200 are sold as cast ewes.

Lambing Percentage

The lambing percentage averages about 125, ranging from 115 per cent. to 135 per cent. At least 50 per cent. of the lambs are sold fat off the mothers every year. The best record for lambs fat off the mothers was set some years ago when 1050 ewes were put to the ram and 120 per cent. of lambs were tailed. The first draft was taken early in December and the second at weaning in the first week of January, and only 16 lambs remained as unfit to draft. It has been impossible to repeat this performance and usually not quite half of the lambs have to be fattened on grass or, very occasionally, on rape. In favourable years it is customary to buy in store lambs for fattening. Some indication of the fat lamb production may be obtained from the following details of the 1952-53 season:—

Ewes to ram, 2,888
Lambs tailed, 3,770 or 131 per cent.

Drafts		
Date	Lambs	Average weight lb.
8/1/53	540	39.43
15/1/53	787	35.37
21/1/53	757*	35.59
	2,084	36.50

* All twin lambs.

These drafts were all off the mothers (55 per cent. of lambs) and contained very few seconds. With the exception of 39 kept for mutton, the remaining lambs, with 542 Romney wether lambs which had been bought in, were all sold fat off pastures at an average weight of 38.14lb. by 10 June 1953.

Details of lambs fat off the mothers for the 1953-54 season are:—

Ewes to ram, 2,800
Lambs tailed, 3,600 or 128 per cent

Drafts		
Date	Lambs	Average weight lb.
10/12/53	502	36.2
18/12/53	427	34.0
5/1/54	554*	34.2
8/1/54	462*	33.9
	1,945	34.60

* All twin lambs.

Drafts were taken earlier than usual. These drafts were all fat off the mothers (54 per cent. of lambs) and contained very few seconds.

This farm has increased its carrying capacity from approximately 1½ ewes to 3 ewes per acre since 1929, it sells consistently 50 per cent. of the lambs fat off the mothers, it produces about 27lb. of wool per acre, and it has shown the part that cattle can play on this foothill country. There are approximately 1,000,000 acres of similar country in Canterbury which in the past has been classed as marginal land. By the application of sound management practices, as have been adopted on this farm, this 1,000,000 acres has a considerable potential.

EDITOR —— P. MACKINTOSH

THE JOURNAL OF THE BRITISH GRASSLAND SOCIETY

This Journal is a medium for the publication of the results of research and practical experience in the realm of Grassland Husbandry.

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Improved Queen Cell Cups and Cell Sticks

QUEEN cells built up from artificially formed cell bases are less fragile and easier to handle than queen cells cut from a comb. Though the making of these artificial cell cups is comparatively simple, many beekeepers fail to produce a cup comparable to the queen cups built by the bees. In this article L. A. M. Griffin, Apiary Instructor, Department of Agriculture, Hastings, describes a method of producing cell cups of a uniform size and depth with very little alteration to the cell-forming sticks already in use by beekeepers.

THERE are many ways of producing a reasonable number of queen cells with complete success, but where large numbers of queens have to be raised for commercial purposes these methods are not altogether satisfactory.

The commercial queen raiser and beekeeper usually makes queen cups artificially and grafts or transfers the young larvae destined for queens into these cups for the bees to feed and complete. From this method a greater and more complete control of production is obtained.

To save time a large number of these cups, possibly a full season's requirements, are usually made at the one time. This is a tedious job, and unless great care is taken in the dipping, the resulting cups will be of varying depths and thicknesses according to the temperature of the melted wax when dipped.

Deep cell cups not only reduce the speed of transferring the young grubs, but give the bees extra work, as it is usual for the bees to tear down part of the cups and rebuild them to their own requirements.

Bees first build a shallow queen cup and taper it to a feather edge just before the queen lays in it. The ideal artificially made cell cup should conform as closely to that pattern as possible and should be not deeper than 5/16in. to ⅜in. This shallow cup is more acceptable to the bees than a deep cup, as it provides easier access to the grub for feeding and a more natural base on which to build the cell as the grub develops. Apart from the ease and extra speed obtained in grafting a large number of cups, there is less danger of injuring the young grubs in the process.

The cell-forming sticks illustrated below were first used many years ago by Mr. M. Morgan, a well-known apiarist in Victoria, Australia. In his search for a satisfactory method of making cell cups of a standard depth that would resemble more closely the natural queen cups built by the bees he thought of the novel idea of cutting a groove in his cell sticks that would allow the wax cups to break away at that point no matter how deep the cell sticks were dipped the first time in the melted wax.

Grooved Cell-forming Sticks

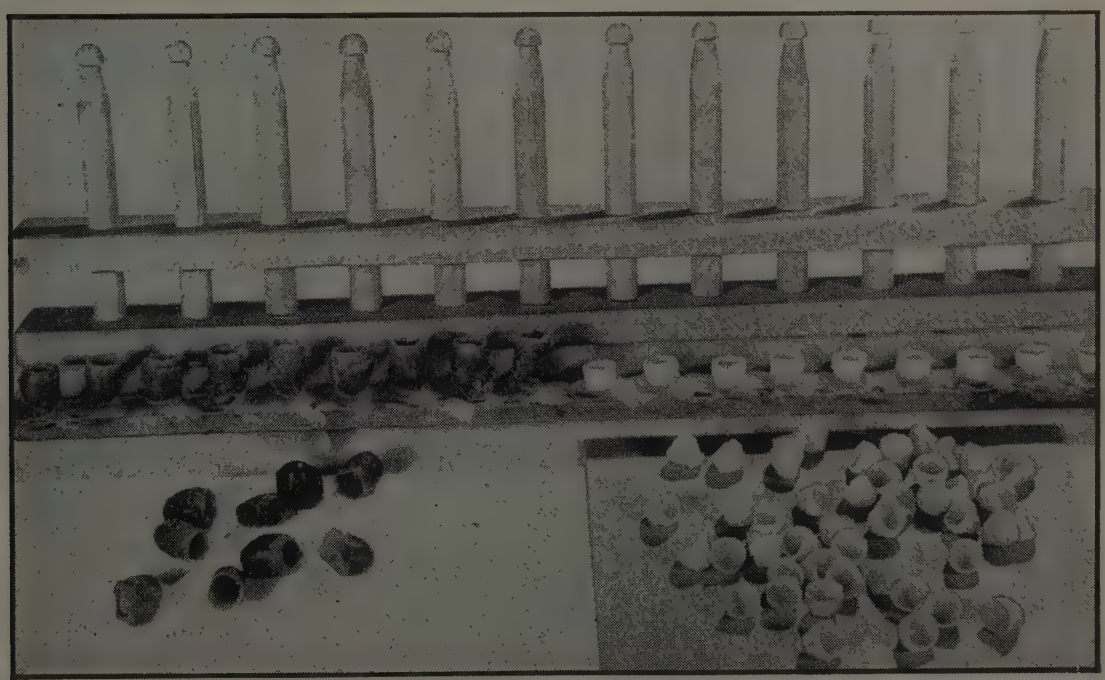
The cell sticks are the usual size, made from 5/16in. dowelling. After the end is rounded on a slight taper a groove as shown in the illustration is cut or turned out about 5/16in. to ⅜in. from the rounded end.

Newly made sticks should be well soaked in water to swell the grain in the wood and then resmoothed with very fine partly worn glasspaper. This will ensure that the forming sticks will always remain smooth and round when swollen with water in the future.

Making the Queen Cups

To make the cups the sticks are dipped into the melted wax above the groove the first time, slightly below the groove the second time, and slightly below that again for a third or subsequent dip. A vessel of cool, not cold, water should be close to the dipping trough for cooling the wax cups after each dipping.

The cups are a little more difficult to remove from this type of forming stick, as it is necessary for the wax to break away at the shoulder of the



The queen cell cups on the right, which were moulded with the cell-forming sticks in the background, are of uniform size and depth. Those on the left, which were moulded with the cell sticks normally used by beekeepers, are thick and lumpy and of varying depth.

groove. An easy way to remove the cups is to hold the rack of cell sticks in the right hand and gently take the cups one at a time between the thumb and forefinger of the left hand, using the forefinger of the right hand to push gently against the tip of the left finger holding the cup. In this way a steady, controlled push and pull motion is obtained. The cups will break away easily with a thin feather edge and will all be the same depth. The small rim of wax left in the groove is easily peeled off with the thumbnail and a turning movement of the hand.

The forming sticks only guarantee the size and depth of the cups. The secret of making good cell cups is in maintaining the melted wax at the correct temperature for dipping. If the wax is too cool, thick, heavy, and often lumpy cups will result, as shown on the left of the illustration. If the wax is too hot, the cups will require extra dipping and the layer of wax from the first dipping will be full of air bubbles. These are caused by the expansion of trapped air when the overheated wax comes in contact with the cool, wet forming sticks. With a few trials the correct temperature will soon be obtained.

A wax trough of sufficient length to take the full bar of cell sticks suspended in a tank of hot water is best for melting the wax, as the correct temperature is more easily maintained. Any receptacle that is long enough to take the cell sticks will do, provided about an inch of water is first placed in the bottom to prevent the wax from contact with the direct heat.

Only the best and cleanest wax should be used for making cell cups. The cups can be placed in wooden cell bases or attached directly to the cell bars with wax. If the latter method is adopted, a sufficient quantity of liquid wax is slowly spread along the centre of the bar, the cups being placed quickly in position before the wax sets.

Rejection of Fat Lambs for Export

A LARGE number of fat lambs never reach the shipping stage because of grading down or rejection at the works for faults caused either through ignorance or want of thought.

Bruising through Rough Handling

The principal cause of rejection is bruising, which could be obviated by care and attention. Many handlers of fat lambs in transit for killing do not seem to care where or how they seize the animals. The result of grabbing a large handful of back or side wool is a large purple-red bruise some 3in. to 4in. in diameter at the root of the wool in 2 to 3 hours.

Similar injuries result from kicks, poking with sticks, slamming with drafting race gates, and contact with projecting portions of races or fences. Last but not least is the dog bite. Too many people trucking, droving, or untrucking lambs are in an unnecessary hurry, exciting the dogs so much that they bite the lambs, frighten them, and make them move much faster.

This rough handling of lambs causes extensive areas of bruising, which in time appear as large, dark red patches on the deeper parts of the skin and underlying tissue, spoiling the appearance and detracting from the value of the carcass. Some carcasses with mild bruising drop to second class, thus losing 2d. per pound. Other more severe cases drop to the reject class with a loss of 8d. per pound; carcasses with more extensive bruised areas qualify for the preserver class and lose 15d. per pound, and with total condemnations there is a loss of 16d. per pound. In one lot of 304 fat lambs sent to the works 16 had been dog bitten and 6 were made second class with a loss of £1 18s. on 38lb. lambs. Another 10 were rejected, showing a loss of £12 13s. 4d., making a total loss of £14 11s. 4d.

Barley Grass Blemishes

Barley grass when in the ripe, seeded stage causes an appreciable loss to the export trade through the seed heads penetrating the skins of sheep and passing into the flesh underneath. There they set up large dark red patches which resemble and have the same effect as brusing, causing monetary loss to the farmer. If barley grass was topped with a mower before ripening, this loss could be largely wiped out.

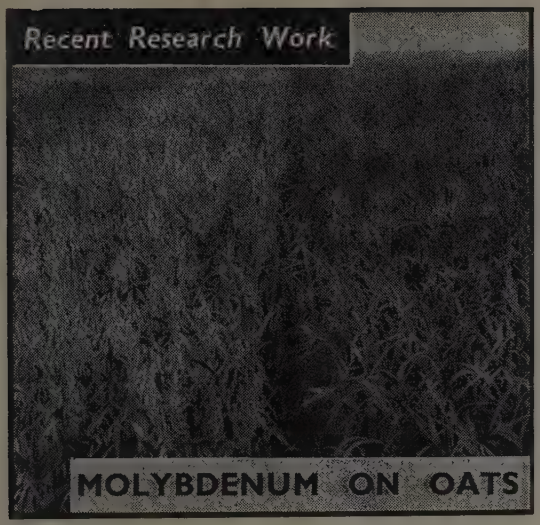
One owner railed a mob of 220 fat lambs to the works; 20 were made second class, a loss of about £6 7s. on 38lb. lambs, and 4 were rejected, a loss of £5 1s. 4d., making a total loss of £11 8s. 4d.

One freezing works in the South Island had to reject for bruising 867 fat lambs in 1953 with a loss to farmers of roughly £1098. There are 37 freezing works exporting lambs and with a similar loss in all of them the export level would be down by 30,345 lambs. It should be possible for those handling fat lambs to take more care and time and avoid this unnecessary loss.

—W. *RICHARDSON*,
Supervising Meat Inspector,
Freezing Works,
Burnside

Ripe, seeded barley grass causes appreciable loss to the meat export trade through seed heads penetrating skins of sheep and passing into the flesh.

A carcass with blemishes caused by injuries received during transit.



TWO field trials have been carried out at the Department of Agriculture's Invermay Research Station, Taieri, which have led to a significant response to molybdenum being obtained in oats. Laboratory work has shown that oats can tolerate a low level of available molybdenum, but the discovery of the very low molybdenum levels in the hill soils on the station and the spectacular responses to molybdenum obtained in pastures and brassica crops led to the belief that similar responses might be obtained in cereal crops. All analyses quoted were carried out by the staff of the Department of Agriculture's Rukuhia Soil Research Station, Hamilton.

TRIAL IN 1951-52 SEASON

THE first trial was laid down on oats in October 1951, the sodium molybdate being mixed with the superphosphate and drilled with the seed. The variety was Abundance and the treatments included sodium molybdate at 2½oz. and 5oz. per acre with 2cwt. of superphosphate and at 2½oz. per acre with 4cwt. of superphosphate. The area chosen for the trial had been ridged in swedes after being ploughed out of old browntop pasture, and the soil analysis was:—

Sample depth	pH	Calcium	Potassium	Phosphorus	Molybdenum (available)
0 to 6in. ..	5.4	5	High	4.5	0.06 p.p.m.

This molybdenum level is of a very low order and typical of the hill soils on the station before treatment.

Thirty-five days after sowing, when the oat plants were 6in. high and beginning to tiller, the no-molybdenum plots showed up a light green compared with the darker green of the molybdenum treated plots. However, this colour difference disappeared as the plants grew taller and no further differences could be seen. When the plots were harvested yields from all treatments were similar with no evidence of any molybdenum response. The growing season was exceptionally wet that year and no response was obtained to the 4cwt. of superphosphate treatment.

TRIAL IN 1953-54 SEASON

The second trial was laid down on 4 November 1953, the seed used having 0.03 p.p.m. of molybdenum. The treatments (Table 2) were similar to the earlier trial except that molybdenum was applied as a foliar spray on some plots and all treatments were sown with 2cwt. per acre of superphosphate. The sodium molybdate was mixed with the superphosphate. The area selected was run-out browntop pasture ploughed in winter and sown directly to oats. The soil type is described by the Soil Bureau, Department of Scientific and Industrial Research, as a silt loam from drift over a clay loam and of the yellow-grey earth group. The soil analyses taken before the area was ploughed were as follows:—

Sample depth	pH	Calcium	Potassium	Phosphoric acid	Molybdenum p.p.m.
0 to 3in. ..	5.8	6.5	25 (V.h.)	4	0.11
3 to 6in. ..	5.5	3.0	16 (V.h.)	1	

A visual response was first seen on 27 November 1953, when the seedlings were at the 2 to 3 leaf stage. The effect was most obvious and treatment 3 was similar to 1, as the foliar spray had not been applied at this stage. In the no-molybdenum plots the oat plants were yellowish green, with retarded growth, and all the larger leaves showed leaf scorch. About 1cm. to 2cm. of the leaf tip was completely withered. In the molybdenum treated plots the oat plants were a healthy dark green, with erect growth and no leaf wilting.

FOLIAGE ANALYSES

Samples of the foliage were analysed for major and minor nutrients (see Table 1). The very high nitrogen, phosphorus, and potassium tests are typical of healthy seedling growth. The manganese level is higher in the no-molybdenum treatment which is usual at low molybdenum levels.

TABLE 1—PERCENTAGE OF DRY MATTER—FOLIAGE ANALYSES

Treatments	Nitrogen	Phosphorus	Potassium	Sodium	Magnesium	Calcium	Manganese	Molybdenum
							p.p.m.	
No molybdenum .	5.89	0.58	6.68	0.13	0.36	0.44	133	0.4
5oz. of sodium molybdate ..	5.95	0.49	6.06	0.10	0.41	0.44	108	0.6
2½oz. of sodium molybdate ..	5.81	0.50	6.16	0.11	0.26	0.40	112	0.6

Sodium molybdate was applied as a foliar spray on 17/12/53, the oats by that time having completed tillering. The colour difference between the treatments had largely disappeared, though a height difference in favour of the molybdenum application was evident. Later observations showed some response to the foliar spray, but the effect was never very apparent. As the oat plots began to shoot the molybdenum treated plots were from 8 to 10 days earlier than the remainder, including the sprayed plots, and height differences were obvious. This effect is seen in the heading photograph. No colour difference could be seen in the foliage at that stage. When the no-molybdenum plots came into ear no height differences were evident, but these plots were less dense that the remainder.

YIELDS

At harvest all plots appeared similar though treatments 1 and 3 were 6 to 7 days later in ripening.

TABLE 2—YIELDS OF HEADED PLOTS BY TREATMENTS

Treatment	Bushels per acre	Difference from control
1. Control: No molybdenum	39.5	—
2. 5oz. per acre of sodium molybdate with seed	57.9	18.4*
3. 5oz. per acre of sodium molybdate as foliar spray	41.9	2.4
4. 2½oz. per acre of sodium molybdate with seed and 2½oz. per acre of sodium molybdate as foliar spray	58.5	19.0*

* Significant at 1 per cent. level.

These results show the highly significant yield increase due to the application of sodium molybdate to oats sown on a molybdenum deficient soil.

A feature of the trials is that the deficiency symptoms disappear when the plants grow more mature, though the growth check is still evident. With the larger and more highly developed root system the mature plant may extract sufficient molybdenum from the soil for normal development, but apparently it does not recover from the initial check received as a seedling. The seedling is dependent on the nutrients in the seed for early growth, and a low molybdenum content in the seed may retard the seedling growth considerably.

Foliar spray applications of sodium molybdate have given very definite responses on rape, swedes, and clovers and a response on oats would be expected. No satisfactory explanation can be given for this lack of response, except perhaps that when it was applied molybdenum was not a limiting factor for normal growth. Application when the symptoms were first observed might have produced a significant response.

—J. N. FITZGERALD

HEADING PHOTOGRAPH: Response to molybdenum from oats. The plot at left has received 2½oz. of sodium molybdate per acre and that at right no molybdenum. The treated plot is earlier maturing.

Care of Livestock during January

[*National Publicity*

Lambs and ewes being drafted off into separate pens at weaning. Special care should be taken at weaning, as it is an important event in the life of a lamb.

Contributed by the Animal Research Division

WEANING is an important event in the life of a lamb and special care at this time will be well repaid. Long-wool lambs should be shorn and all others crutched.

WEANING LAMBS

If the weather is wet, lambs should be given a full dose of 20 grammes of phenothiazine at weaning; otherwise drenching may be postponed until the advent of rain. If fattening crops are not available, lambs should be drafted into "clean" paddocks. Lambs should never be weaned into paddocks in which ewes and lambs have been grazed during the previous month. Unless very good paddocks of spelled pasture are available, hoggets should be spread thinly over as large an area as possible.

CULLING OF EWES

After lambs have been weaned the ewes should be gone through carefully to select those which require culling. Feet and wool should be examined carefully. Special attention should be paid to udders and teats, and ewes should be culled if they have defective udders or very large or damaged teats, as the lambs of such ewes often die from starvation before they are a week old. On good fat lamb farms too much attention is often paid to teeth. Provided ewes are in reasonable condition and have sound udders and good fleeces, they should be retained. Even "gummy" ewes will rear satisfactory lambs on good pasture. Lambing percentage increases with the age of the sheep and reaches the highest level when the ewes are 5 to 8 years old. Many ewes on fat lamb farms could well be kept for 1 or 2 years longer, but fat ewes which have not reared a lamb should be culled. Ewes should be kept on low rations for 2 months after weaning to prevent their becoming overfat.

FODDERS FOR LAMB FATTENING

Rape should not be grazed by lambs until the leaves show a purplish tinge. "Unripe" rape does not fatten lambs so quickly and seems to "scald" them more readily. Best results are probably obtained by grazing rape in breaks which last the lambs about a week. Keeping lambs on a break until the last leaf is eaten is false economy; they should be moved on while they are still getting a full feed, and the paddock can be cleaned up with ewes. Run-offs have little to recommend them, and unless they contain good pasture they will depress the lambs' rate of growth. If hay is fed, it must be of the best quality. Thousand-headed kale is splendid lamb-fattening fodder, but because it is relatively unpalatable it must be managed properly. It must always be fed in small breaks and grazed only lightly before the lambs are moved on to the next break. Use of a run-off is not advised. Treated in this way, kale makes excellent regrowth and can be grazed several times; if necessary, grazing can be extended into autumn and winter.

ST. JOHN'S WORT MAKES DIPPING DANGEROUS

Sheep that eat St. John's wort become sensitive to sunlight and develop scabs on the ears, face, and back. If sheep in such a condition are dipped, they take convulsions and may be drowned. If possible, sheep should be grazed on country free from St. John's wort for several weeks before they are dipped. If that is not possible, they should be dipped only on dull days.

ERGOTISED GRASS MAKES DANGEROUS HAY

Serious lameness in cattle can be caused by their eating hay heavily infested with ergot. Such hay can be easily recognised by the black ergots which replace the seeds of rye-grass and other grasses. Where ergot is known to occur hay should be made before the grasses have time to seed.

DIPPING OF SHEEP

Modern sheep dips are so effective that the eradication of lice and ticks should be quite feasible. However, best results will be achieved only if the instructions for mixing and replenishing dips are followed accurately. Carelessness in dipping can cause disastrous losses. If sheep are dipped off shears, the shear cuts are likely to become infected and deaths from blood poisoning may occur, but this can be prevented by vaccinating the sheep with blackleg vaccine at least a fortnight before dipping them. The vaccine is available at a reasonable price. Veterinarians or Livestock Instructors should be consulted about its use.

ERADICATION OF FOOT-ROT

Campaigns for foot-rot eradication should be started as soon as the lambs have been weaned. Once foot-rot has been eradicated from a flock it does not recur unless it is reintroduced from outside. Department of Agriculture Bulletin No. 325, "Foot-rot in Sheep Can be Eradicated", gives instructions for such campaigns.

Pasture Improvement on Surface-sown Hill Country

Seasonal Notes by the Extension Division

ON surface-sown hill country secondary sowings on fern and manuka burns, topdressing and oversowing with clovers, and discing for seed-bed preparation for autumn-sown grass should all receive close attention at present. The destruction of manuka by the mealy bug *Eriococcus*, commonly called manuka blight, has posed some new problems in pasture improvement on manuka-infested country.

MANUKA BLIGHT ON country where manuka blight is merely taking the place of scrub cutters in clearing up light infestations there is no problem, but on areas where dense thickets have been destroyed pasture development should consist of either clearing up with cattle and later improving with topdressing and oversowing or burning the dead scrub and resowing.

CLEARING WITH CATTLE Where the manuka has only recently taken over from typical hill-country pasture the latter will re-establish and cover the ground, though other plants, notably bracken fern and flat weeds, compete with the grasses in making new ground cover. By stocking such areas, particularly with cattle, the farmer can open up the thickets and let light in, thus helping the grasses to establish quicker. Stocking with cattle will also suppress fern and other weeds. As the manuka is opened up and breaks down sheep can be used to develop a pasture little inferior to the usual untopdressed hill country sward. Preliminary trial work in the oversowing of clovers and grasses on blight infested manuka thickets indicates that oversowing would best be left until a grass pasture is established and full light can get to the ground. Ordinary oversowing and topdressing should then be effective in improving the sward.

BURNING Dead and dying manuka after a dry summer is highly inflammable and the fire stick can be used effectively to clean up blight-infested areas ready for reseeding to better grasses and clovers. Where it is intended to burn off and reseed it is best to wait until the bulk of the manuka is dead. This will take some years from the time the manuka blight makes its first appearance. In the meantime the area should not be stocked, the idea being to let several seasons' undergrowth of grass, fern, and weeds grow and die off. This material together with the fallen leaves and branches of the dead and dying manuka makes a really hot and effective fire. Wide firebreaks should be cleared round areas to be burnt and the burning should be done where possible against the wind. This precaution is necessary to prevent widespread and uncontrolled fires in country infested with manuka blight. Immediately after burning in March or early April the area should be sown to a good pasture mixture and topdressed. It is strongly recommended that money which would have had to be spent on cutting the manuka before burning should be diverted to adequate topdressing. Providing the young pasture establishes well, the manuka blight can be depended on to take care of seedling manuka before the plants have much chance to damage the new pasture.

WEED-INFESTED MANUKA THICKETS In many places unfortunately the manuka thicket is infested with blackberry, gorse, broom, and other such weeds, including ragwort. The death of the bulk of the manuka can still be taken advantage of, however, in getting a much fiercer and better fire than would be possible if there was no dead manuka present. Such burns should be followed by reseeding to grass, with the use of plenty of clovers and by heavy topdressing to assist in heavy stock concentration on the area, particularly of sheep, to help control and suppress any further weed invasion. Eventually it should be possible to clean up such areas by the use of hormone weedkillers.

—C. J. HAMBLYN

* * *

OVERSOWING IN NORTHLAND THE soil surface must be bared for the successful establishment of oversown clovers. In the lighter rainfall areas when pastures consist of danthonia, browntop, and paspalum it is necessary to burn off roughage before surface sowing to allow the seed to come in contact with the soil. Seed sown in early autumn is often germinated by showers which are followed by a dry period, and it is preferable to delay sowing until late March or April, when rain is more certain. In higher rainfall areas which carry a better type of pasture cattle may be used to advantage to clear roughage before sowing. Burning or grazing out roughage with large numbers of stock before surface sowing is, however, as important as in light rainfall areas. The seeds mixture in light rainfall areas should consist of 2lb. of subterranean clover and 2lb. of white clover, and if the ground surface has been well burnt down, 2lb. of crested dogstail and 3lb. of perennial ryegrass may also be sown with the clovers. In the higher rainfall areas where a heavy growth of fern and roughage has been burnt a mixture consisting of 2lb. of white clover, 4lb. of crested dogstail, and 5lb. of perennial ryegrass should be sown. Half a pound of *Lotus major* may be added if the plant is not already established in the sward, and 1lb. of subterranean clover should be added on northern and eastern slopes. One or two pounds of paspalum may be added, but the establishment of paspalum by oversowing is slow. Where possible it is best introduced by feeding paspalum hay in late spring. Scattering seed along sheep tracks in spring is also a suitable method of introducing paspalum. When the pastures already consist of a close cover of browntop and other grasses white clover and *Lotus major*, if not already present, are the essential plants to introduce, and 2lb. of white clover and ½lb. of *Lotus major* should be used for oversowing.

—C. E. BALLINGER

* * *

CEREALS FOR GREENFEED SEASONAL factors lowering the autumn production of pastures and the yields of root and green fodder crops often render it necessary to provide cereal greenfeed catch crops on stubble land for autumn, winter, or spring feeding in the lower rainfall arable farming districts. Oats, feed barleys, and ryecorn are the cereals commonly grown for greenfeed. The variety chosen will depend mainly on the time of sowing and the period when the greenfeed is most likely to be required. For early sowing (February), particularly on fallowed land, ryecorn will produce a good bulk of high-quality feed that can be used safely throughout winter and spring. Certified N.I.A.B. is a reliable strain of ryecorn. For sowing in March oats will be most satisfactory. Algerians have been the most popular variety, but Winter Greys have gained favour in recent years. If sowing is delayed until April, the feed barleys are the only cereals that will grow sufficiently quickly to give much feed before spring. Black Skinless is somewhat quicker than Cape. The grazing of both oats and barley by ewes approaching lambing must be done with care, as losses sometimes occur on this feed at this time. Seeding rates are between 2½ and 3 bushels per acre for oats and barley. Ryecorn should be sown at 2 bushels or at 1 bushel with ½ bushel of Italian ryegrass. All cereals should be drilled with 1 to 1½cwt. per acre of superphosphate.

—C. P. WHATMAN

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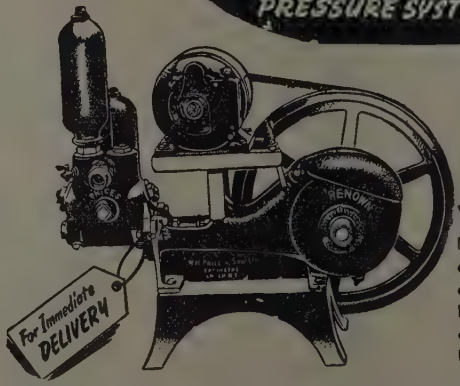

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An Improved Asparagus Variety in Canterbury

CONSIDERABLE interest is being taken by asparagus growers in Canterbury in an improved variety which was recently introduced from overseas. Over a number of years careful breeding and selection of both male and female plants were carried out to obtain a strain of a very high standard, and K.B.F. is the result. This improved variety, together with notes on cultural practices, is described in the following article by L. C. Hurndell, Horticultural Instructor, Department of Agriculture, Christchurch.

MANY people do not grow asparagus because they are under the impression that it requires special attention. Asparagus needs no better cultivation than do potatoes and cabbage, but two important factors in growing asparagus are the choice of a good strain and the selection of good, vigorous crowns. Best results cannot be achieved if weak crowns of a poor strain are planted.

K.B.F. strain was raised in England by Mr. A. W. Kidner after several generations of controlled breeding, both parents being rigidly selected. Grown under Canterbury conditions it has shown up as a very vigorous plant capable of producing a large number of well-formed, sturdy spears. The fern growth in the second year from planting reaches a height of 6ft. or more and is dense and compact. The root growth of 2-year-old crowns is tremendous, extending over an area of several square yards. The roots are thick and fleshy, showing capacity for food storage. Buds are large, numerous, and well formed. One-year-old crowns suitable for planting out have an excellent root system and a good supply of healthy buds.

Preparation of Soil

Asparagus will grow on a wide range of soils provided drainage is satisfactory. The plants will not tolerate "wet feet". Under good soil conditions and proper treatment a bed should produce profitable crops for many years. The incorporation of organic matter is important, as it improves the moisture-holding capacity of the soil and provides a good supply of nutrients for the initial build-up of the crowns.

Green manure crops such as barley, oats, or lupins may be grown the season before planting to supply the necessary organic material, or fowl, sheep, or stable manure may be applied before preparation of the bed. The growing of cover crops may be difficult once asparagus is established, but farmyard or organic manures can be applied between the rows during winter. Fern growth should never be removed from the growing area. When it turns yellow in late autumn it may be cut and cultivated in to increase the humus content of the soil.

It is most important that land where asparagus is to be grown should be freed of troublesome weeds such as twitch, convolvulus, Californian thistle, and docks, as the eradication of these is difficult once the bed is established.

With commercial plantings in the Christchurch district, land which has previously been in pasture is often shallow or skim ploughed to assist the breakdown of the turf. Later a second ploughing is made to a depth of about 6in. to 7in., which allows the partially decomposed turf to be turned in deeper but still within the reach of soil micro-organisms that break it down. A third ploughing, to a depth of 2in. to 3in. greater than the normal planting depth of the crowns, is carried out before planting. The land can then be worked down to level it and obtain a reasonable tilth.

Left—Plant of K.B.F. asparagus 19 months from seed. Right—Base of plant of same age.

A 1lb. bunch of K.B.F. strain asparagus containing 12 spears. An indication of the size of spears is given by the penny at left.

In home gardens the preparation of asparagus beds consists of digging in plenty of bulky organic matter some months before planting. Light cultivations should be carried out periodically to reduce weed growths; then before planting, the bed should be dug to a depth of 10in. to 12in. and the soil cultivated to a reasonable tilth. Depth of cultivation will be governed by the depth of the soil.

Planting Time and Distances

The general culture of K.B.F. strain does not vary greatly from that of any other variety, and whether planting is for the home garden or for commercial production it is essential to plant good crowns. Weak and spindly crowns cannot be expected to give good results even in the best of soils. Strong, healthy plants must always be chosen. One-year-old crowns are recommended for planting, as older plants of this variety may be difficult to handle because of the extent of their root systems.

For commercial gardens plants may be set out from August until about mid-September, but later planting is not recommended. Depth of planting will be governed by the type of soil, but normally crowns should be covered to a depth of 6in. to 8in. In light, sandy soils the deeper planting is advisable if the soil tends to dry out in summer. On heavy soils the depth of planting can be reduced.

Planting distances vary slightly in some districts, but the normal distances for this variety in Canterbury are 5ft. between rows and 2ft. apart in the rows. This will give approximately 4400 plants per acre. Each plant should be allowed not less than 8 sq. ft.

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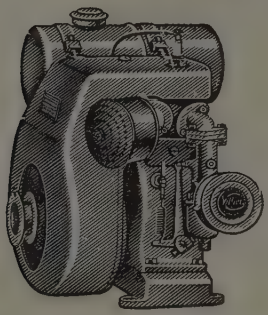

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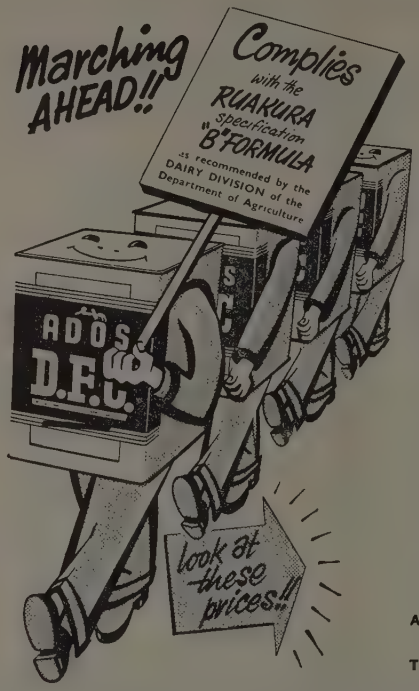
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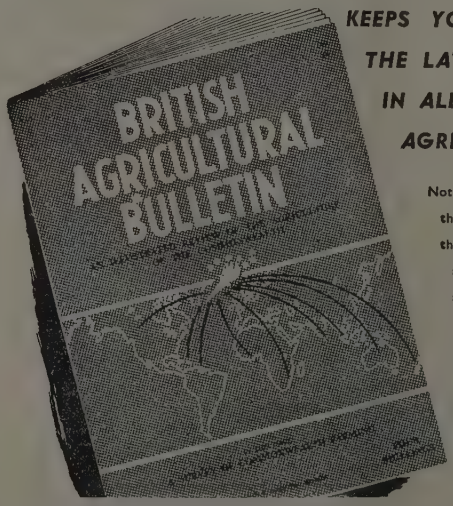

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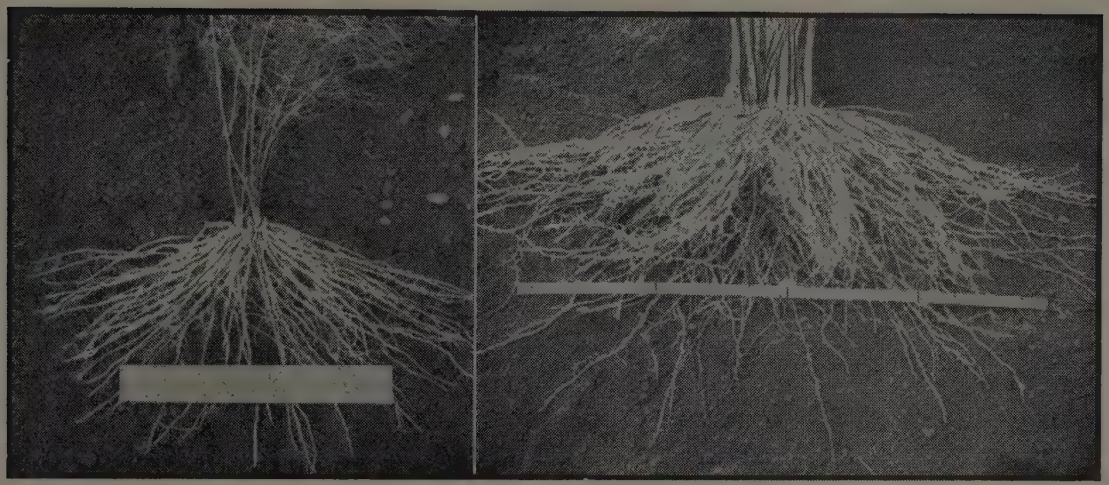

Root systems of K.B.F. asparagus plants 1 year old (left) and 21 months from seed (right). A foot rule is shown with the former and a 3ft. rule with the latter.

Before planting it is advisable to cultivate the furrow in which the plants are to be placed about 2in. deeper than the normal planting depth. The crowns then have cultivated soil under them to facilitate easier root establishment.

Planting should be done as soon as possible after the furrows are opened and while the soil is still moist and easily worked. Soil that has been left to dry out will not settle firmly around the roots and this will probably result in some plants failing to become established. The roots of the young crowns should be spread umbrella-wise in the furrow and covered with about 3in. of soil. This soil should then be pressed down firmly. As the fern grows the remainder of the furrow may be filled in by subsequent cultivations, thus helping to keep down weeds by smothering them as they germinate. By about the middle of the growing season the crowns should be covered to their normal depth and the beds should be level.

In the home garden much the same practice as for commercial planting can be carried out, but owing to the smallness of private sections, closer planting may be adopted; for instance, distance between rows could be 4ft. and distance apart of plants in the rows 18in. Where space is limited intercropping may be carried out before the asparagus comes into production, but careful choice of crops, such as quick-maturing vegetables, is recommended. Inter-cultivation should be done carefully to avoid damage to the roots of the asparagus.

Cultivation

During the growing season shallow cuts between rows may be made with a rotary hoe or grubber to suppress weed growth. The matured fern growth may be cut and cultivated in, as it provides a good supply of organic material. If any seedling plants appear, they should not be permitted to become established, but should be treated as weeds.

In late autumn several shallow discings may be carried out to incorporate in the soil any farmyard manure that may be used as well as the fern growth and to obtain a satisfactory tilth.

A single shallow discing—sufficient to loosen the soil surface and to provide for the easy emergence of the new season's spears—is carried out in early spring.

Area of K.B.F. asparagus 19 months from seed.

Fertilisers

There are no hard-and-fast rules governing fertiliser applications to asparagus beds, but they should be applied to ensure good growth throughout the years. In general asparagus prefers a slightly acid soil, but will grow quite well under neutral or slightly alkaline conditions. If the soil tends to be too alkaline, the alkalinity may be reduced by applications of sulphate of ammonia, which will also supply nitrogen. Nitrogen supplies should be kept at a fairly high level with phosphates and potash to maintain a satisfactory balance. On most soils light applications of lime are beneficial.

Though it will tolerate salt (its habitat is coastal areas), there is no evidence that salt is beneficial to asparagus.

Harvesting

The first cutting of K.B.F. strain can be made 2 years after the crowns are planted. Being very vigorous, it will produce a good supply of excellent spears by that time. As excessive cutting in the early life of the bed tends to weaken the crowns, a light cutting only is recommended for the first harvest.

The duration of harvesting varies with the season, but usually it is of 8 to 10 weeks. Cutting ceases about the end of November and the fern growth is then allowed to develop to build up good crowns for the following season.

The K.B.F. variety may not be favoured by canners, as its vigorous growth produces much larger spears than are generally used for canning. For the market and home gardens it is excellent, and in the opinion of many it surpasses all other varieties in size, yield, and vigour.

Acknowledgment

Acknowledgment is made to Professor E. R. Hudson, of Christchurch, for information and assistance given.

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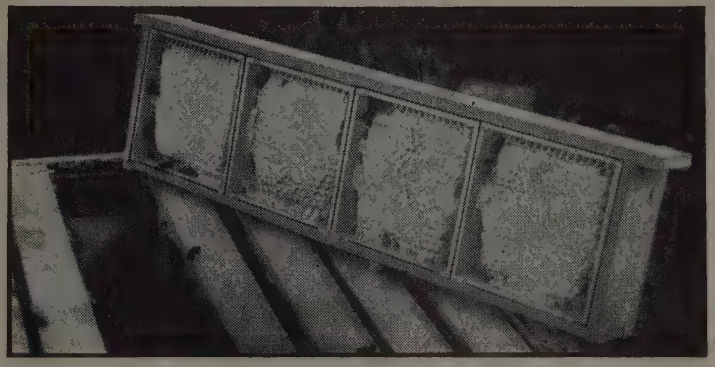
Provision of Storage Space in Hives

Seasonal Notes for the Domestic Beekeeper

SUMMER, with its long, warm, sunny days carrying the promise of a bountiful honey harvest, is a most interesting season for the beekeeper. The yield of honey will, apart from weather conditions, be largely governed by the skill and attention expended earlier, but the bees still require further care if they are to give of their best. In this article D. Roberts, Apiary Instructor, Department of Agriculture, Auckland, discusses the provision of adequate storage space in hives to meet and encourage the bees' gathering of nectar.



Sections of honey ready for removal.

WITH the onset of a summer nectar flow the seasonal activities of the bee colony become greatly intensified. The whole available force of worker bees is devoted to the collection and ripening of nectar and the building of comb. Colonies used for observation purposes have been known to register a gain of as much as 25lb. of fresh nectar per day during a heavy flow. The intake of honey at such a rapid rate may quickly use up a colony's available storage space, and unless further room is given, congestion may soon become unbearable and the bees prepare to swarm.

Extracted Honey

The main essentials of management for extracted honey at this period are the provision of adequate room sufficiently in advance of the bees' requirements to prevent congestion but not extending the colony unnecessarily, and good ventilation. The latter is essential at all times but more particularly so in honey flows.

During the earlier part of a flow the bees will be found to build comb readily, but as the flow progresses comb building may diminish and then cease. The provision of extra room by the addition of frames of comb foundation can be practised safely while comb building is in progress, but foundation should not be used if the bees show reluctance to build further comb. If spare drawn combs are not available, it is a good plan to remove any combs of honey that have been filled and capped over, extract the honey, and return the empty combs to the bees. The use of an extractor is, of course, necessary if the combs are to be returned in a condition fit for the immediate storage of more honey. Combs from which the honey has been removed by scraping or pressing will be of little more value than foundation at this time.

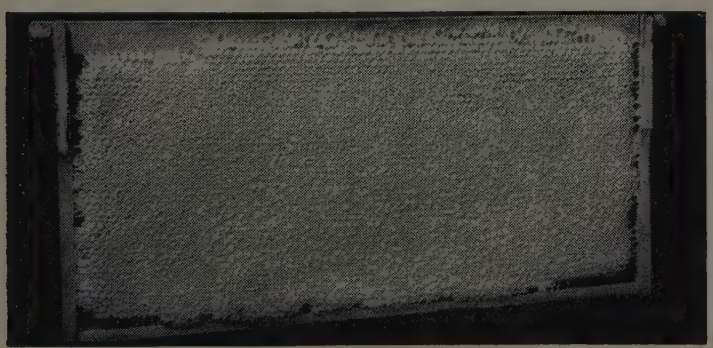
In some districts the honey gathered before the main flow commences will be dark and of poor flavour. If it is desired to keep this separate from the later, better-flavoured crop, immediately the main flow is established any combs containing such honey should be removed as soon as they are fully capped over. If not required for winter stores, the honey can be extracted and the combs returned to the bees. The ability to secure drawn comb at critical times is one of the great advantages of the use of an extractor. When combs wet with honey are returned to the bees considerable excitement is caused, and it is generally advisable to carry out this work in the evening when the daily flight has ceased. To assist in the prevention of spread of brood disease, combs should be returned wherever possible to the hive from which they were taken.

When it becomes evident that the nectar flow is approaching its close the hives should be checked and any honey supers containing little or no honey removed. The remaining supers should be examined and any completed or nearly completed combs should be moved to the outer edge and the balance placed to the centre. This will encourage the bees to complete as many combs as possible. If too much comb space is left with the bees when the flow is diminishing, the honey will be stored in patches over a large number of combs rather than in a smaller number of filled ones.

Comb Honey

Though colonies being worked for comb honey production will, like those being managed for extracted honey, require additional room from time to time, much greater care must be taken in the provision of extra comb space and the amount provided should always be substantially less than that provided for extraction. When the bees are found to be working vigorously in the first super of sections or half frames and the combs have been well built out and are nearly filled with honey another super of sections or half frames may be added on top. This should not be given unless the flow is heavy and it is obvious that the bees will be pressed for room. If some of the sections are partially capped at the time of examination and others are only lightly filled or in the process of being drawn, no more room should be given at this time.

The colony should be examined again in 2 or 3 days and any completed sections or frames removed and replaced with others fitted with foundation. Sections and other forms of comb honey destined for sale should be removed from the hive immediately they are fully capped over. If they are left for more than a few days after capping is completed, the freshness of the cappings is lost and the combs become darkened and travel



An extracting comb well capped and filled.

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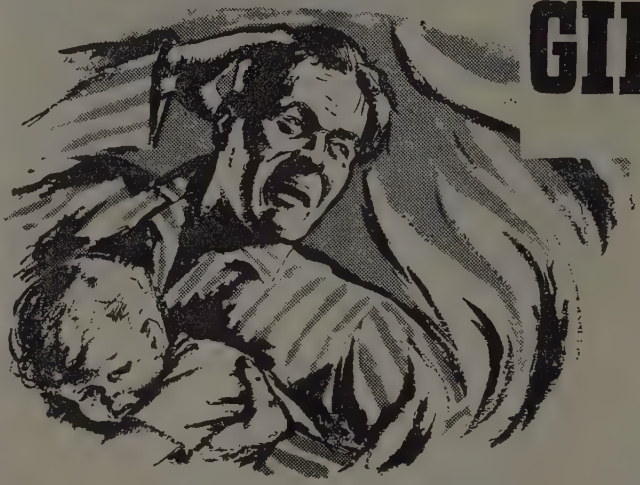

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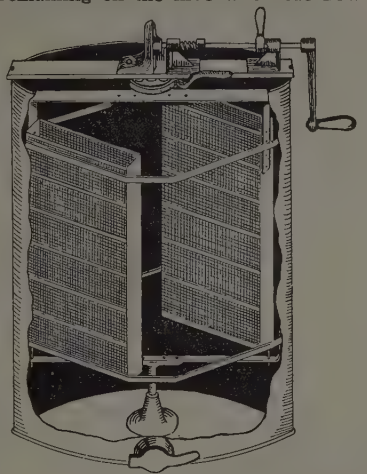
stained through the bees moving to and fro across them.

Should the season provide only a moderate yield of nectar, two supers of 28 sections each will generally provide sufficient space for other than exceptional colonies. If more sections than are absolutely necessary are given, the excess space will most likely result in the sections worked being poorly filled and only partially completed. To obtain heavy, well-filled sections it is essential that the bees at all times are provided with only the minimum space necessary to accommodate them.

The maintenance of this position throughout the period of the honey flow requires constant supervision of the bees and a very thorough understanding of the vagaries of the weather and the nectar sources in the locality. Should a very heavy nectar flow occur, many more sections than mentioned above may be needed. In this event the need for constant supervision is even greater, and the demand for room should be met by the removal of completed sections or combs and their replacement with foundation rather than by the addition of more supers. In comb honey production the aim should be to have as many as possible of the combs drawn out, filled, and completed.

When it is seen that the flow is diminishing, all undrawn foundation and any completed combs should be removed and the balance compacted as much as possible. For example, if there are two supers of sections remaining on the hive when the flow



A 2-frame reversible extractor suitable for home use.

begins to taper off, the undrawn sections and those only partially drawn should be removed together with any that may be completed. One super filled with partially completed sections is thus left on the hive. A good, vigorous colony will normally complete this amount before the flow ceases entirely.

Where more than one colony is being worked for comb honey it will often be found that one is showing a much greater tendency to complete sections than the others. Any surplus partially finished combs remaining after all colonies have been reduced to one honey super may be given to the most vigorous working colony, where they will be most likely to be completed.

If the production of comb honey is to be profitable, it is essential that the number of uncompleted combs left at the end of the season be held to a minimum. This desirable effect can be achieved only by maintaining a close watch on the progress of the nectar flow and at the first indications of slowing up reducing the number of sections to the bare minimum. Colonies left with too much storage space will build only partially filled or very thin combs which will have little or no commercial value. The success or failure of comb honey production is at all times in a very large measure dependent on colony management during the nectar flow and particularly on the beekeeper's understanding and knowledge of the conditions and plants governing the flow.

Book Review

"General Survey of the Soils of North Island, New Zealand": Soil Bureau Bulletin (n.s.) 5

THIS survey of North Island soils was carried out during the Second World War by about eight officers of the Soil Bureau and almost completed within a year. This is a tremendous achievement which was possible only because during several earlier limited surveys of North Island soils the officers acquired knowledge which enabled them to map and classify soil units efficiently over the rest of the country. At the same time, however, the speed of the survey did not allow for great detail. Mr. N. H. Taylor, Director of the Soil Bureau, is careful to point out in the introduction that the soil units shown in the four miles to the inch map accompanying the bulletin are not soil types in the strict sense of the word but sets of closely related soils. Also small areas of other soil occurring within a soil unit are disregarded on the map and all boundaries are approximate. For this reason the maps are not a suitable guide for the farmer, because he wants to know small differences in soils occurring on his property and such differences cannot be picked up on the map. For the agricultural instructor and others with good knowledge of the soils of their district, however, these maps are ideal.

The publication includes a chapter on the general classification and properties of New Zealand soils, a legend describing individual soil types in detail, and chemical tables offering a large amount of data.

The chapter on soils gives a lucid description of soil groups and explains their classifications with the aid of good illustrations. All soils derived from volcanic ash are simply arranged into units. Each unit is called a suite. Within each suite the individual soil sets are grouped according to maturity. For instance, the soils derived from the most recent shower of Taupo ash make up the Taupo suite, and within this suite soils are grouped as immature, semi-mature, and submature types; that is, according to their stage of development. On the other hand, the soils derived from sedimentary rock are, on the whole, grouped only according to the stage of development and not according to their parent material; that is, they are not placed into soil suites.

Following the general explanation of how New Zealand soils are classified is an "Extended Legend". This, to quote from the bulletin, "presents in tabular form a summary of selected data that have been correlated broadly with the soil units". In these tables a comprehensive picture of the soil is obtained. Two comparisons immediately attract attention. One is between present and possible future uses of the soil, the other between present and potential carrying capacity. The standards set for potential use and potential carrying capacity are as far as possible derived from what has already been done by the good farmer on each soil set. With some soil sets, however, the legend has had to rely on an educated guess. For this reason the estimate of potential may be a little uneven, as pointed out by Mr. Taylor in the bulletin. One of the good things the bulletin has done, however, is to put these opinions into print so that they can be criticised, clarified, and amended if necessary.

Information is also provided on the pasture responses obtained by top-dressing and liming. Unfortunately these notes are, in part, out of date.

In a 25-page table presenting the chemical analyses of soil sets results are quoted from about 800 soil samples representing over 400 soils. Nearly every sample has been analysed for base exchange data, pH, total nitrogen, carbon/nitrogen ratio, and citric acid-soluble phosphate and potash. This information could have been gathered only by a tremendous amount of work. The tables are very interesting, but deserve a lengthy introduction and would perhaps be more easily accessible to some readers if a text were included explaining chemical features or chemical characteristics of each important group or suite of soils.

The eight main coloured maps covering the North Island at a scale of four miles to the inch are very good and the choice of colours is excellent.

A soil legend and maps classifying all soils of such a large area into a unified system by a rapid reconnaissance survey is a unique achievement, and its publication is of great value to all teachers and others who are professionally interested in agriculture and geography.

—*C.D.*

New Zealand Department of Scientific and Industrial Research. 16s. 3d. (maps additional).

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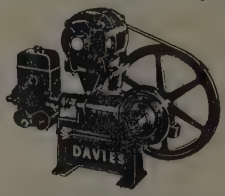

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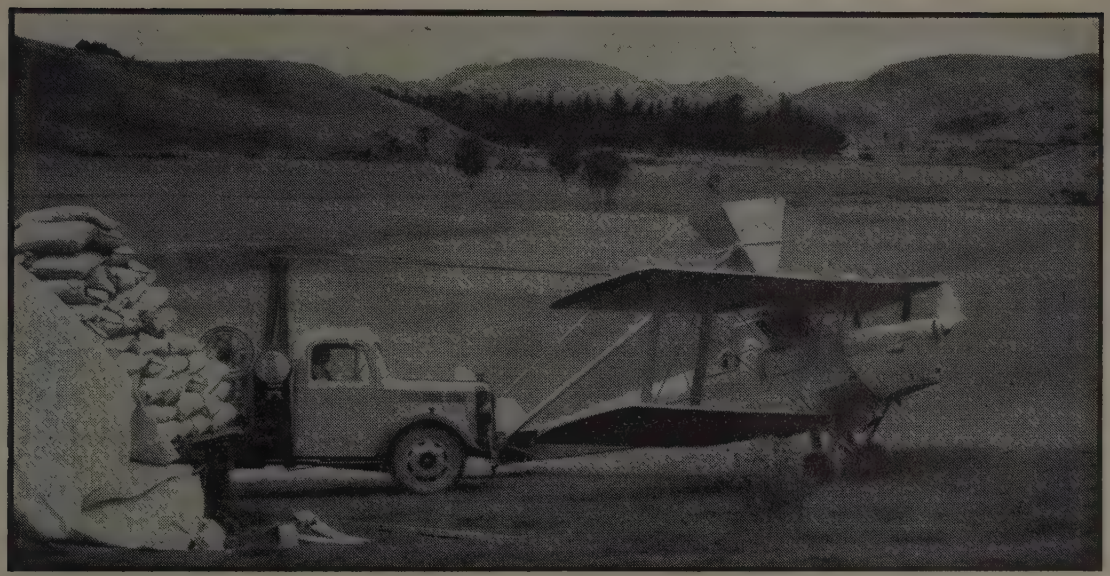


Oversowing Clovers in Southern Hawkes Bay

TRIALS carried out in the southern Hawkes Bay district over a number of years have shown that clovers can be established successfully on hill country pastures by oversowing. Though there is admittedly an element of luck in securing a good strike from oversowing, a proper appreciation of the principles involved and a determination to put them into practice will go a long way toward success and L. W. Blackmore, Instructor in Agriculture, Department of Agriculture, Dannevirke, here advises on application of these principles.

THE factors of importance are: Selection of species suitable for the country to be oversown; sowing when the chances of success are greatest; proper preparation of the country to receive the seed; use of sufficient phosphatic fertiliser, especially in the initial stages of development; careful management during initial establishment, and full utilisation of the extra feed grown.

There must be a proper balance of expenditure on seed, manure, and fencing on the one hand, and numbers and kind of stock on the other.

Suitable Species

Because of variations in rainfall, soil, slope, aspect, and wind intensity in different parts of southern Hawkes Bay, the mixtures most suitable for oversowing will vary a good deal from one locality to another. White clover is by far the most important single species for oversowing and should be included in all mixtures, except, perhaps, on the driest soils. Though it may not contribute a great deal of feed on the drier country in seasons of lower-than-average rainfall, it will show up again in wetter years, and with the build-up in fertility over the seasons will gradually become more predominant in the sward. White clover is a perennial and has a remarkable capacity to spread by overground runners. The amount of this clover in a mixture should never be reduced in favour of any other species without very good reason.

Where rainfall is low and where soils do not hold moisture well, particularly over summer, subterranean clover, which is an annual, should be the main constituent in the mixture. This species does particularly well on open-textured soils. It is a prolific seeder and has a remarkable capacity to re-establish from seed each year with the autumn rains, thus ensuring

White clover is a perennial which has a remarkable capacity for spreading by overground runners. It is the most valuable of all pasture clovers and should always be included in mixtures for surface sowing on hill country, except perhaps on very dry soils.

HEADING PHOTOGRAPH: It is of little use oversowing high-producing species of clovers if the phosphorus status of the soil is too low to allow them to thrive. Aerial topdressing with phosphatic fertilisers has enabled the more valuable clovers to be introduced into many previously poor hill country pastures.

its perpetuation. Subterranean clover is a good winter grower and thrives well with liberal topdressing. Where subterranean clover is included in a mixture half should be of the Mt. Barker strain and the remainder should be Tallarook, which seeds later, thus ensuring a better spread of feed.

Montgomery red clover is a valuable species for inclusion with white clover. It is easily the best summer producer, but unlike white clover it has not the capacity to spread in a pasture other than through reseeding, and it will not withstand close grazing to the same extent. Though usually classed as a perennial, it is not as permanent as white clover.

Lotus major, also a perennial, thrives on land too wet and cold for other legumes to do well. Experience has shown that though it is usually slow to establish, once it gets a hold it will spread and produce well, even where phosphate topdressings are not regular.

Both for raising the clover percentage quickly and also for stepping up production from the sward to the highest possible level, the sowing of Certified clovers with the initial topdressing is of prime importance. Even where clover already exists in reasonable quantity oversowing with the best type is still recommended, as experimental results have shown that it is more vigorous and productive under these conditions than are the naturally occurring types.

Time of Sowing

Autumn sowing has over the years given the most satisfactory results. Though good strikes are often obtained in spring, establishment is generally poor, because the spring and early summer flush of grass usually overwhelms the young clover plants. Oversowing should be done as early as the autumn rains will allow. The ground should be moist enough to prevent its drying out before the seedlings have established themselves properly. Given these conditions, March is the best month. Sowing after April is likely to give disappointing results, as clovers do not strike well once the ground temperature drops and the days are short.

Preparation of Pasture

Unless the seed falls close enough to the ground for the rootlet of the seedling to make a quick contact with moist soil, the seedling has little or no chance of survival. For this reason the pasture should be reasonably short. If the sward is open as well, the chances of securing a good strike are considerably increased. Any roughage should be cleaned up with cattle. Their hooves will also open up the turf. It is sound to drive stock over an area immediately after oversowing, as this pushes seed into the ground and shakes seed suspended in the leafage downward.

Subsequent Treatment

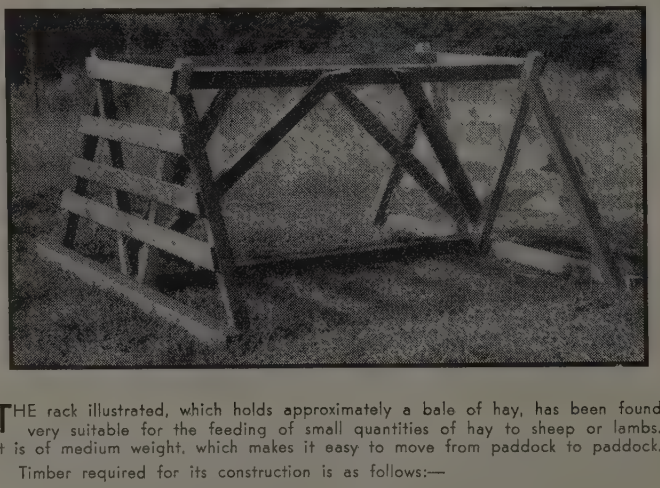
The area should be closed to stock, usually for a month to 6 weeks, while germination and early establishment are proceeding. Subsequently the chief aim in management should be to strike a balance between undergrazing and overgrazing. Just as much harm can be done by undergrazing as by overgrazing.

If the autumn flush of grass is allowed to get away, it will smother out much of the clover. The young clover plants must be able to get their leaves into the light if they are to survive. The whole area should be grazed off quickly with a big mob of sheep by the on-and-off system. The grazing should be quick but not hard. The area should then be spelled for 3 to 4 weeks. This management should be repeated until the clover is well established.

The value of careful management before and after sowing cannot be over-emphasised and no effort should be spared to keep conditions as near the ideal as possible to give the establishing seedlings every chance of survival.

If full advantage is to be gained from the extra growth, it must all be eaten, but too frequently this is not fully appreciated. The extent to which this is done is usually a fair measure of the success achieved and the returns obtained for the expenditure of oversowing. If the pasture is not effectively controlled, not only will the stock suffer, but the pasture itself will go back and the build-up in fertility will be greatly reduced.

Rack for Feeding Hay to Sheep and Lambs



THE rack illustrated, which holds approximately a bale of hay, has been found very suitable for the feeding of small quantities of hay to sheep or lambs. It is of medium weight, which makes it easy to move from paddock to paddock.

Timber required for its construction is as follows:—

Sides			Ends		
Dimensions	Length	Number of pieces	Dimensions	Length	Number of pieces
3in. x 1in.	5ft. 6in.	4	3in. x 1in.	2ft. 6in.	2
3in. x 1in.	3ft. 6in.	4	3in. x 1in.	3ft. 2in.	2
2in. x 2in.	3ft. 3in.	4	3in. x 1in.	3ft. 11in.	2
			3in. x 1in.	4ft. 9in.	2
			2in. x 2in.	3ft. 6in.	4
			4in. x 3in.	5ft. 6in.	2

The timber for the sides is bolted together with 3½in. x 5/16in. carriage bolts, 16 bolts being used for each rack. The sides are covered with sheep netting. The wide ends of the rack eliminate any danger of its being tipped or blown over.

—W. STEER, Farm Manager, Department of Agriculture Irrigation Research Station, Winchmore

Sixty Years of British "Agriculture"

"AGRICULTURE", the monthly journal of the British Ministry of Agriculture, was 60 years old in September of this year. Since September 1894 it has maintained an unbroken service to the farming community in England and Wales and readers overseas, steadily widening its scope and influence and recording and evangelising new methods and ideas throughout a period in which there have been more vital changes than in any other comparable time. Contributions from the highest technical authorities with articles by farmers, market gardeners, and fruit growers have shown it to fulfil its claim as a clearing house of agricultural knowledge and experience.

To commemorate the occasion the Ministry has issued a special diamond jubilee number which, while surveying the tremendous progress of the past 60 years, also looks forward, through the eyes of several eminent agriculturists, to the future. An enlarged art section presents a portrait in miniature of the countryside of England and Wales.

Copies may be obtained from H.M. Stationery Office, P.O. Box 569, London, SE1, at 1s. per copy, post free.

Gadgets in the Kitchen

HOUSEWIVES, once they have acquired their essential kitchen equipment, tend to be divided according to two schools of thought: Those who are for ever collecting gadgets for a multitude of purposes as time and their savings permit, and those whose tastes are conservative and who prefer their old way of doing things, whatever the job. The former may find they have acquired some useless and possibly expensive gadgets, and the latter may be doing considerably more work than is really necessary or spending more time than is needed over many tasks. This article by Evelyn E. Moore, Field Officer in Rural Sociology, Department of Agriculture, Palmerston North, gives suggestions for choosing labour-saving equipment for the kitchen and for planning drawer and cupboard space to accommodate it.

THE variety and scope of specialised equipment are continually expanding and some gadgets are so efficiently designed that even the most sceptical housewife will find them of value, provided she follows carefully the directions for using them.

The advantages of a lot of time-saving gadgets are, of course, likely to be offset if there are inefficiencies in the kitchen such as saucepans of poor quality that cause foods to burn badly or waste fuel because they have uneven or badly dented bottoms. Likewise an inefficient stove, knives and scissors which refuse to take or keep a sharp edge, or an inconvenient kitchen and badly placed cupboards and equipment will waste more time and patience than gadgets, however efficient, are likely to save.

Therefore, when a home is being remodelled or a new home built it is better to spend money on planning and building a really efficient kitchen with durable, easy-to-clean bench tops, sink, and cupboards, and on buying really good basic equipment, rather than on such equipment as dishwashers or electric mixers and blenders. Gadgets are usually of two types—the small, manually operated ones and the more expensive, generally electrical, equipment. The former vary from egg timers to bean slicers and special types of graters, mincers, and juice extractors; the latter include mixers and blenders, pressure cookers, fruit-preserving equipment, and electric waffle irons.

Care in Selection Essential

Care in the selection of this equipment is essential, as a wide range in quality is often available. Before purchase the housewife should ask herself: Is it of sturdy construction; has it parts that will rust easily and make care and maintenance difficult; is it easy to hold and use; is it easy to wash, dry, and store, or is special care necessary to maintain it in good condition; will much skill in operating it need to be acquired before it can be used efficiently; and, most important, will it be used sufficiently frequently to justify its position in a drawer or cupboard where it is apt to be in the way of other equipment?

Small gadgets can be divided into several groups: First, special equipment for cutting and peeling such as potato peelers, parsley cutters, grapefruit knives, tomato slicers, egg slicers, bean slicers, marmalade slicers, potato chippers, pie crimpers, and biscuit cutters; second, measuring equipment, including the various types of measuring cups and spoons, and scales; third, equipment for sifting, mincing, grating, pureeing, and straining foods; fourth, equipment for mixing and beating. Finally there are all the miscellaneous gadgets which do not quite fit into the above groups such as the varied collection of tongs, jar holders, attachments for sides of saucepans and frying pans for holding spoons and food, pea shellers, cake icing sets, cake tins with rotating lifters, "non-burn" cake tins, apple corers, cherry stoners, and butter curlers.

It is improbable that a complete set of gadgets for every task will result in a more efficiently run kitchen, for each home conforms to a certain pattern of living which naturally results in some gadgets being seldom if ever used. Also equipment which will perform more than one task is usually more useful than that designed for a specific purpose only—for example, bean slicers are apt to be in use for a limited period only and perhaps occupy needed cupboard or drawer space for the rest of the year. However, equipment is available for grating and slicing finely a wide variety of foods, including beans, root vegetables for soups, cheese for cheese dishes, and even fruits for marmalade. Such graters and slicers could be in regular use and would save time.

Such equipment should be easy to assemble and wash and should also be of durable construction as far as can be judged. Articles with a well-known trade name or from a reliable manufacturer of more expensive equipment who usually gives a guarantee should be chosen. Gadgets should also efficiently perform the tasks for which they

Gadgets for peeling, slicing, and cutting, and measuring and weighing equipment.

were made, and, for example, should not have cutting blades which wear quickly and require sharpening by a special tradesman.

Though the housewife should be prepared to spend a certain amount of time in learning to use new gadgets and should follow the instructions for their use carefully, there should not be too much difficulty in learning to use them. For example, anyone who has developed considerable speed and skill in peeling with a knife may find a peeler comparatively slow and awkward the first time it is used. However, most women who persevere and practise with a peeler find that if it is sharp and is used properly, it speeds and simplifies the work.

Generally the more complicated a gadget of this type is the less valuable it is because it is often more difficult to wash, takes up room, may be awkward to store or assemble, costs more, and is often more difficult to repair or replace.

Peeling, Slicing, and Cutting Equipment

Apart from the standard peeling knives, a wide range of peelers is available. Though often called potato peelers, they can be used also for peeling many other foods such as carrots, turnips, apples, and peaches. Some practice is needed with the relatively new "double action" peeler before it can be used efficiently, after which most users will probably find that it peels more quickly than the older type. An advantage of such peelers is that they are safer to use than knives and other types of peelers and prevent cut fingers, especially with children who are learning to help in the home. The value of other peelers and slicers depends largely on the amount of use they are likely to get, for in many homes seldom-used gadgets merely get in the way in drawers or cupboards. These would include pastry cutters, grapefruit knives, tomato slicers, egg slicers, and potato chippers, all of which are, however, efficient. Other equipment such as bean slicers, pie crimpers, and biscuit cutters is designed more for producing an attractive, even product than for saving time and labour.

Measuring and Weighing Equipment

Some form of measuring or weighing equipment is essential if new recipes are to be used with success by the housewife. Measuring is usually quicker than weighing, though weighing produces more accurate results with some foods such as flour and with vegetables and fruits for pickles, sauces, and jams. A spring balance is quicker to use but requires testing for accuracy occasionally and may require adjusting. For measuring, heat-proof glassware is desirable, though aluminium measures are efficient and more durable. For measuring hot liquids a measure with a heat-proof handle is desirable. Sets of measuring spoons are more accurate than a graduated measuring spoon, and are much more convenient to use for measuring baking powder and other dry foods in small quantities. Greatest convenience can probably be achieved by duplicating measuring cups—storing one near the sink and one near the stove for example—and it is important that other measuring equipment be stored in convenient positions. Standard measuring equipment, that is, the cup which measures 8oz. and a graduated set of spoons with a tablespoon which measures 1/16 of a cup, is the most useful to buy, as these are the measures most commonly used in recipe books.

Sieves, Graters, and Mincers

Equipment for sieving, grating, and mincing is, of course, essential and the choice since imports have become relatively unrestricted is extremely varied. Mincers have been standard equipment for many years, but new points to look for are rubber clamps which will not harm the table or bench, rust-free fittings, ease of turning, a generous cup for the food, and a set of fittings for mincing foods to various degrees of fineness. Cutting blades should be sturdy and sharp. Some of the newer types combine the functions of grater, sieve, and mincer. Though comparatively less expensive, they are of less sturdy construction and slightly more difficult to use. As they fit over a bowl, there may be an advantage to some housewives, and another advantage is that when they are used for grating foods there is no danger of grating the fingers, as in some of the standard types.

The marmalade cutter, though of relatively limited use, is another item of equipment that may be worth its purchase money to a large household of marmalade eaters who like their peel sliced. Coffee mills and spice and pepper mills are among the luxuries that might be regarded as necessities by the gourmet, but they are neither time nor energy savers.

A great variety of shapes and sizes of graters is procurable. A grater should be easy to hold and have drilled rather than punched holes. Graters with the latter are harder to use and do not grate the food as cleanly.

Strainers of all shapes and sizes are also now available. As the wire screen breaking away from the metal rim is usually the first sign of wear, the care with which this is joined is a good indication of durability. Two or three pieces of metal ribbon beneath the bowls of some serve as extra support, but may make cleaning slightly more difficult. Conical strainers or sieves are also available, but are perhaps generally less useful, though their greater strength makes them useful when food is being sieved for purees. The size of wire screen should be chosen according to the work most likely to be required of the strainer. Though strainers may also be used as sifters, a flour sifter is useful. Whatever type is chosen, it should be manipulated before it is bought to ensure that the sifter works easily. Sifters are made either of tinned steel or aluminium; the latter has the advantage of being rust free.

Beaters and Mixers

A beater and mixing spoons are essential. Useful adjuncts which are simple to use and have no moving parts to break are the rubber scraper and the quick mixer shaped like a tumbler with special grooves in the lid, sides, and bottom for mixing, and made either of plastic or aluminium. It mixes milk shakes for children, flour and water for thickening, and custards, and whips cream quickly and efficiently and is easily washed and stored. Care should be taken to avoid denting the aluminium mixer, as this causes it to leak, and the instructions should also be followed carefully. Wooden spoons with a flat side and straight bottom are also worth searching for, as they are effective in reaching right to the junction of the side and bottom of the saucepan when sauces and soft custards are being stirred. There are also specially shaped and slotted spoons and scoops or combination spoons and beaters, most of which are efficient.

Miscellaneous Gadgets

During recent years there has been a great increase in the number of gadgets designed to make new or novel types of baked goods, such as special types of cake tins, cutlet pans, egg poachers, and the various items designed for one purpose such as pea shellers, spoon holders (for the sides of saucepan), the gadgets designed to unscrew the lids of preserving jars, and cake-icing sets.

Doubtless a great many of these gadgets are bought on the spur of the moment to be seldom, if ever, used. Often such equipment is chosen for its novelty value rather than for its durability and ease of cleaning and care, but a really useful gadget of this type will also be of good design and durability. Storage space may also need to be considered for a small kitchen, as overcrowding of cupboards and drawers can cause great inconvenience. Whether such gadgets as fairy irons, cutlet pans (in addition to an ordinary frying pan), wire fish baskets, special fruit preserving equipment, pressure toasters, the various types of coffee makers, and moulds for cold cookery will be of real value to a housewife depends usually on the amount of entertaining she does, whether she enjoys and does much baking, cooking, and preserving, and whether the novelty foods produced by some specially designed gadgets will tend to pall on acquaintance. Others may possess disadvantages which outweigh their advantages. For example, there are sandwich tins with a small rotating lifter which does remove the cake efficiently and prevents it sticking to the bottom of the pan, but it is extremely difficult to clean under the lifter, detracting from its value.

When small gadgets are being chosen it is preferable to select a few utensils each of which will perform a number of tasks rather than a number of gadgets with individual uses.

The articles should be sturdily constructed, with smooth, seamless surfaces and free from rough edges whenever possible. They should enable the work to be done efficiently, in moderate time, and with a minimum of effort, and should be reasonably easy to clean. Handles should be comfortable to hold, made of a durable material, and firmly fastened to the utensil with no unnecessary grooves.

Electrical Equipment and Large Equipment

The large, more expensive items of equipment naturally cause even the most enthusiastic gadgeteer to think twice before embarking on a purchase which may prove an expensive white elephant.

Such equipment includes pressure saucepans, preserving equipment, electric mixers and blenders, waffle irons, jugs, toasters, coffee percolators, hot plates, roasters, grills, and portable stoves. All can be useful time savers,

Various types of equipment for sieving, grating, and mincing.

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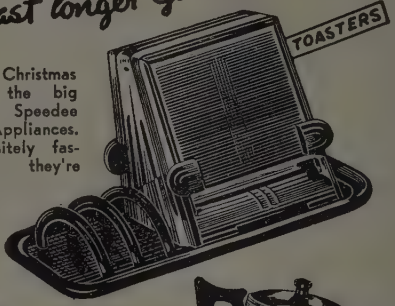

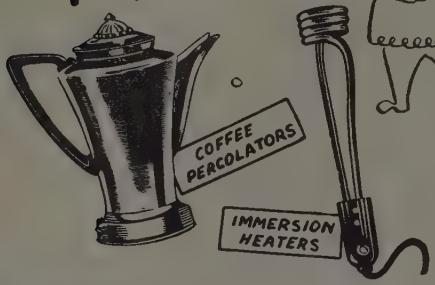

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Some beating and mixing equipment is simple and some is complex.

but are not equally useful to everyone. The pressure saucepan, for example, though in constant use in some homes, has been relegated to a dark corner of the cupboard in others. It has frequently proved a boon to the housewife who, through a variety of outside interests, finds she has little time to spend in her kitchen. With the aid of a pressure saucepan she can provide her family with a wider variety of menus, and such economical dishes as stews, soups, suet puddings, and slow cooking meats and legumes can all be included in the menu without great inconvenience, many cooking easily in the period that it takes to prepare the rest of the meal. A quick, high heat to raise the temperature in the cooker rapidly also adds to its speed and convenience.

Points to look for include an absolutely level base for economical heating on coal, electric, and heat storage ranges, ease of serving (high narrow cookers are apt to be awkward to handle in this respect), a simple weight-type pressure-control mechanism, ease of cleaning, heat-proof, comfortable handles, and convenient size. Generally the medium or large pressure saucepans are more useful—even for a small family—as a wider variety of foods, such as a whole fowl, may readily be cooked in them.

Electric jugs and plungers have been widely used for so long that the majority of housewives have learnt, if only by a process of trial and error, of the points of construction which tend to provide the best service and durability. A guarantee, a solid metal element and non-tarnishable metal for the jug, ease of cleaning, a good-quality plug and cord, and insulated handles on metal jugs are indications that the rest of the workmanship is good. Electric jugs with trailing cords provide an element of danger where there are small children, and the various types of gadgets designed to prevent jugs from tipping are good investments. Alternatives to jugs are the various insulated heaters which can be permanently installed over a sink. Their desirability depends on the quality of the hot water service already available, the demand for instant hot or boiling water, and the need for safety where there are small children.

Electric Mixers

Most housewives who plan their meal cookery and baking so that they make good use of their electric mixer will find it a useful time saver. However, it is an expensive item of equipment and careful consideration would be necessary before the purchase of an electric mixer, to ensure that the money could not be better spent on rebuilt cupboards or benches, the renewal of other equipment, or the purchase of other labour-saving equipment.

To make the best use of electric mixers they should be installed in a permanent and convenient position on a bench or special cupboard so that they are instantly available for all small tasks as well as the larger ones. There are two main types of mixer available—models with a detachable mixing unit which can be carried across the room and used, for example, at the stove, and models in which the mixing unit and stand are all in one piece. All types of mixers are provided with at least one bowl, and some have quite a variety of attachments for different tasks and two sizes of bowls.

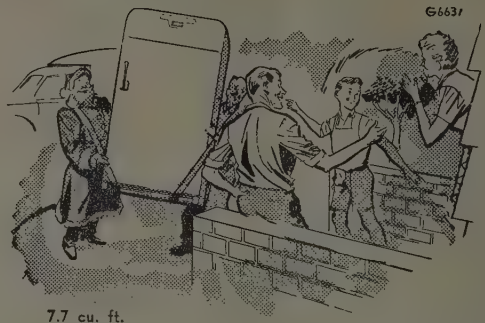
Most essential are multi-speed control with a dial which is easy to read and easy to reach and a motor with adequate power for all mixing jobs. It is also desirable that the motor give a constant speed at any setting, even with the heaviest batters, and that it should run quietly. The blades in some beaters are designed to avoid spattering and the necessity for continually scraping the mixture into the centre of the bowl, and in a well-designed beater they should just clear the bottom of the bowl when in position. The bowl platform should also be able to be shifted so that the beaters will be in an off-centre position when a large bowl is being used, and the platform should turn easily so that mixing is done thoroughly even with stiff batters. It should also be easy to remove the beater blades for cleaning and the motor unit if it is a portable type. Sealed-unit types which require no oiling, and others which require regular, if infrequent, oiling are available.

Mixers will do many more kitchen tasks through a variety of attachments such as the grater and mincer, juice extractor, and beverage mixer, which also purees fruits and vegetables. The main points to remember in their care are never to let water or juice splash or run into the motor, and, if it is a type which requires regular oiling, to remember always to do this.

Blenders do work that mixers cannot do without special attachments; they will liquefy or puree fruits and vegetables, mince meats, crackers, and dry bread, grate foods such as cheese, chocolate, and orange peel, mix the

Like Christmas

G6631



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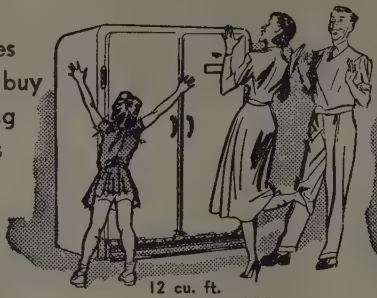

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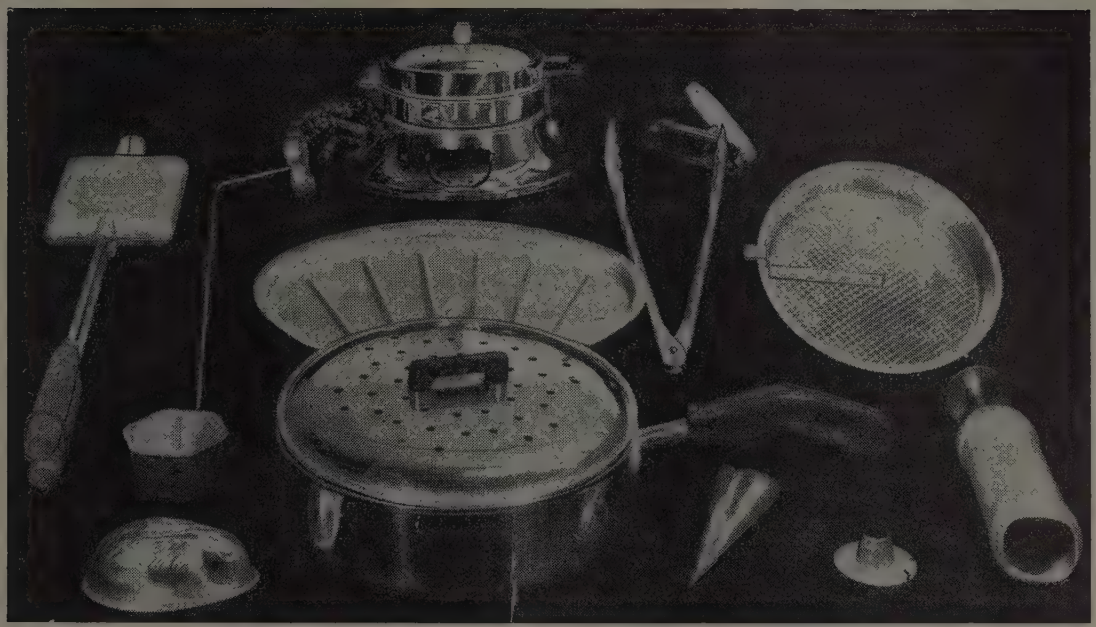


Miscellaneous gadgets which would have only limited use in some homes.

liquid ingredients for cakes, and waffle, and pikelet batters, mix milk shakes, and blend other liquids. They require the same care as mixers, and though slightly less expensive than mixers are, in most homes they are less generally useful. Like other equipment mixers should be smoothly finished, easy to clean, and of sturdy construction, and bowls should be heat proof and deep enough to prevent food spattering easily.

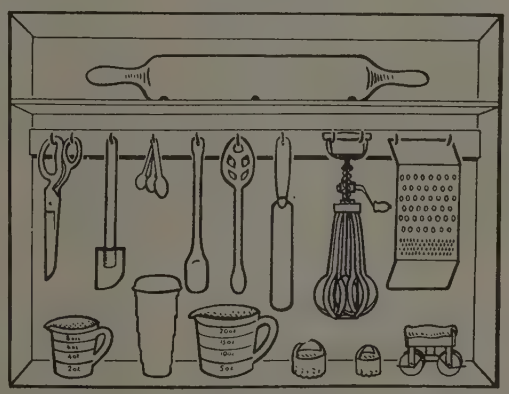
Other Electrical Equipment

Toasters nowadays are sufficiently common for most people when choosing a toaster to know the points to look for, which include heat-proof insulated handles, easy disposal of crumbs, ease of operation, and an element consisting of flat metal ribbon on mica sheets, as this is one of the most durable types.

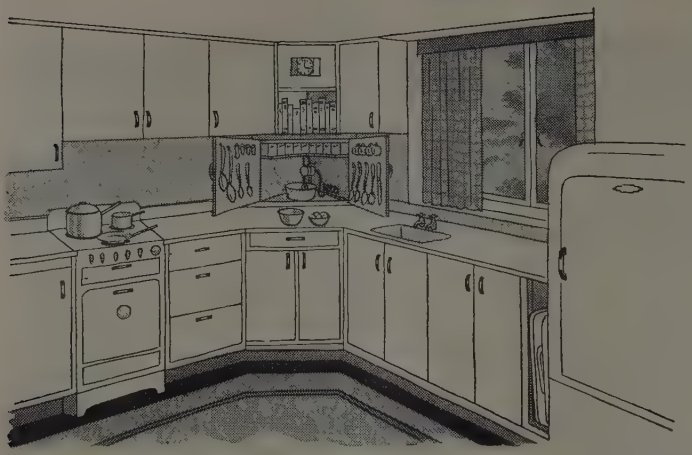
The automatic toasters, though they originally caused considerable trouble, have been improved. However, as they are controlled by relatively delicate mechanisms, more care for trouble-free performance is required than for a conventional type. It should be possible to set the toaster easily for new or stale bread, brown or white, and to remove half slices of bread easily. A combination of clock and thermostat control that assures perfect browning at every setting regardless of any fluctuation in voltage would also be desirable. Some practice in obtaining good results may be necessary.

Electric hot plates, plug-in stoves, and grillers are items which may be useful in the small flat or occasionally in a country kitchen where coal or other fuel is used for the main cooking. In these cost is apt to be a good indication of durability and general usefulness. The cheaper models are apt to be slow heating, poorly insulated, and suitable for cooking only the most simple dishes, and also not entirely trouble free. The best models have two cooking units on top, one with higher wattage for fast heating and also supplying three heats, and have well-insulated ovens, thermometers, and bottom elements, which may also be controlled on high, medium, or low heats; permanently attached heavy-duty cord is also desirable. Electric coffee makers and percolators, waffle irons, grillers, fruit preserving outfits, and pressure cookers may all be regarded as luxuries in the average home, and even then the prospect of a fair amount of use would be necessary to justify their purchase. If they are going to be useful, such points as ease of cleaning, a non-tarnishable finish, heat-proof handles, a well-insulated base, and guaranteed servicing with regard to the replacing of burnt-out elements and correction of other faults which may develop should be considered.

Waffle irons should have baking grids of solid cast aluminium, a base broad enough to catch any excess batter, and a temperature indicator. Fruit bottling outfits may be desirable for the housewife who preserves a lot of fruit and who demands a high standard of quality in the products.



A small, above-bench storage cupboard for a baking centre. Top shelf—Rolling pin. Hanging, from left—Kitchen scissors, rubber scraper, measuring spoons, wooden spoon, metal spoon with holes in it, spatula, beater, and grater. Bottom shelf (at bench level)—8oz. measuring cup, quick-mix shaker, 20oz. measuring cup, large biscuit cutter, small biscuit cutter, and chopper (for parsley, nuts, etc.).



A kitchen planned for convenient storage of equipment. The corner cupboard on the bench holds an electric beater, and the insides of the doors are fitted with hooks for storing measuring spoons and other cooking utensils. The drawer under the bench provides storage for the mincer, apple corer, parsley cutter, and similar equipment. The cupboard below holds larger utensils.

Planning Storage for Gadgets

In the majority of modern houses the total amount of cupboard and drawer space is adequate. However, it is often not well planned. Shelves may be too deep, too far apart, too low or too high, and drawers may be too shallow, too deep, too narrow, or placed in the wrong places for convenient storage. Bins are sometimes badly designed, doors may be hung the wrong way round, and other faults may become apparent in the gleaming and supposedly efficient modern kitchen. It is particularly important, in planning the best place to store time and labour saving equipment, to make a note of these faults and make a special effort to store the equipment where it can be found easily and quickly and where it is at hand when needed. For example, potato peelers and peeling knives should be stored by the sink, and rolling pins, measuring spoons, pastry cutters, and rubber scrapers at the bench near the flour and sugar bins, where cakes and puddings are prepared.

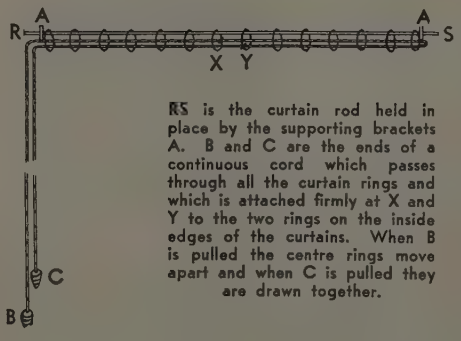
In the storage of all utensils, therefore, and particularly of labour- saving gadgets, there are two simple rules: Allow adequate storage space at the place where the equipment is to be used and plan the storage space to fit the equipment. Small gadgets are usually most conveniently stored on hooks on a wall or bracket. If it is felt that this gives an effect of untidiness, they can be placed on the insides of cupboard doors, or a special door, built out from the wall only the depth of the utensils to be stored, can be built with hooks on the inside, being easily opened when the equipment is required, but compact and out of the way the rest of the time. Drawers should be well built so that they open and shut easily and with partitions, as this makes selection easier and quicker. Deep drawers are generally unsatisfactory for equipment, as it is difficult to sort out what is required. Seldom-used utensils often clutter up storage space with the result that drawers become over-full and difficult to close and it becomes difficult to find quickly the utensil needed. One way of sorting out non-essential equipment and planning the best storage space for that used frequently is to lay out the contents of some bulging drawer or cupboard on a corner of a bench and put the utensils away again as they are used. What is left at the end of a fortnight can then usually be relegated to high, out-of-the-way cupboards or even the rubbish tin if it is obvious it has been superseded by more efficient or modern gadgets.

Safety in storage and use is also an important consideration. For example, heavy equipment should be stored at or below bench level, and bowls, plates, and tins should not be stacked precariously, one on top of another, requiring perhaps only a small jolt to bring them tumbling down. Electric jugs and other electrical equipment should never be used with long, trailing cords, which are not only apt to fray and wear, but are an open invitation to infants, who can seriously injure or burn themselves by pulling over jugs of boiling liquid. In this respect, when a kitchen is being planned or remodelled it is a good idea to plan the number and position of points for electric appliances carefully and to make allowance for possible future purchases.

The housewife who wishes to make her kitchen as labour saving as possible should aim not only at the acquisition of an all-electric kitchen or a mere accumulation of labour-saving gadgets, but should keep always in mind the tasks performed, especially those that take a long time, and should aim at reducing this time. This may be accomplished by purchasing a mixer or dish washer, or it may be by reorganising and replanning the kitchen, or even perhaps by the simplest of all methods—the reorganisation of equipment, time, and working procedure, as poor or casual organisation may be the greatest time stealer of all.

All photographs by Bell Studios.

A Simply Made Drawstring for Curtains



RS is the curtain rod held in place by the supporting brackets A. B and C are the ends of a continuous cord which passes through all the curtain rings and which is attached firmly at X and Y to the two rings on the inside edges of the curtains. When B is pulled the centre rings move apart and when C is pulled they are drawn together.

CURTAINS attached by curtain pins to rings on a curtain rod are frequently drawn across the window by being grasped by the edges and pulled. This method has obvious disadvantages. An arrangement by which they can be operated with cords without the curtains being touched can easily be made with very little effort and no expense beyond the purchase of a few yards of blind cord and two tassels or acorns for the ends of the cord.

The curtain ring at either end of the rod is held rigid so that it will not move when the cord is pulled (it can be slipped over or tied to the bracket supporting the rod). The cord is then threaded through the rings and attached firmly to the two middle rings. When one end of the cord is pulled the curtains are drawn apart, and when the other end is pulled they are drawn together.

—MAUD B. STRAIN,
Field Officer in Rural Sociology,
Department of Agriculture, Dunedin

Red Flowering Trees

THE three lovely red flowered trees, two eucalyptus species and pohutukawa, described in this article by F. E. Wilkin, Plant Quarantine Officer, Department of Agriculture, Wellington, are all easily grown in most coastal districts in the North Island and in districts not subject to heavy frosts in the South Island. These trees are not very particular as to soil; indeed the lovely New Zealand pohutukawa grows naturally on rock-bound northern coasts with a minimum of soil and provides welcome shelter from the fairly strong, salt-laden winds in such localities. The section on flower garden work for January is by M. Joanna Lockie, Horticultural Instructor, Department of Agriculture, Auckland.

SHELTER, however, is fairly important for the red flowered *Eucalyptus leucoxylon* var. *rosea* and the crimson flowering gum *Eucalyptus ficifolia*. As these plants will grow into fairly large trees, they are especially suitable for large gardens and landscape effects. All belong to the myrtle family, which has a large section with brilliant flowers like powder puffs. A number of species possess red or yellow styles and stamens.

Pohutukawa (*Metrosideros excelsa* syn. *M. tomentosa*) is the magnificent blood-red flowered Christmas tree of New Zealand which when in full bloom is for sheer brilliance of colour unsurpassed by any other tree in the world. Many trees of this species in their natural habitat are literally covered with a 1½in. pile of crimson styles and stamens which hides every leaf in the profusion of glorious flowers.

On northern coasts where the pohutukawa is most at home individual trees can be found in full bloom from October until March or April. This suggests that by selection the range of New Zealand's flowering trees could be extended. The majority of pohutukawa trees, however, bloom about Christmas time. A tree may flower for about 2 weeks, but it is at its best for about 3 days, when it will be found to be swarming with bees, and tuis and other birds are attracted by its abundant nectar.

Many different shades of red are to be seen among pohutukawas. Some trees have flowers of the most brilliant crimson imaginable and others have flowers of a brick red shade; for this reason care should be exercised in the selection of trees for cuttings or seed.

Another attractive feature of the pohutukawa is the flower buds, which have a covering of dense, matted, fine, woolly, silvery hairs. The undersides of the leaves and twigs often have a similar covering, which contrasts well with the dark green upper surface of the foliage.

In a favourable situation a pohutukawa may reach a height of 70ft. and have an immense spread of branches, especially when overhanging water in a sunny situation. Mature trees are slow growing, however, and would probably take 100 to 200 years to reach the above dimensions.

The wood is pink, heavy, and dense. Seasoned wood from coastal trees is hard enough to make gaps in a sharp axe. The boughs are much sought after for boat knees because of the bends and twists in them; as firewood it gives out a very fierce heat.

When young the trees grow about a foot a year in favourable situations, and flower at about 8 years from planting. A sunny, well-drained position is best for growth and sturdy development.

Soft tip cuttings taken from mature trees and raised under glass will be found more resistant to frost when planted out than are seedlings with their delicate juvenile foliage. The juvenile foliage is chiefly distinguished from the mature foliage in being paler and softer in texture and not having fine matted hairs on the underside.

Young seedlings are subject to attack by psyllids, scale or aphis-like native insects which cause an embossed appearance of the leaves. Examination will show the psyllids in the pits on the undersides of the leaves. They can be controlled with a spray of nicotine sulphate, 1 : 600 plus soft soap; for small quantities the formula is as follows: Nicotine sulphate 6 teaspoons, soft soap 2oz., and water 4 gallons. As soon as the plants acquire their mature foliage they will no longer be attacked by psyllids, and they will also be found to be quite hardy.

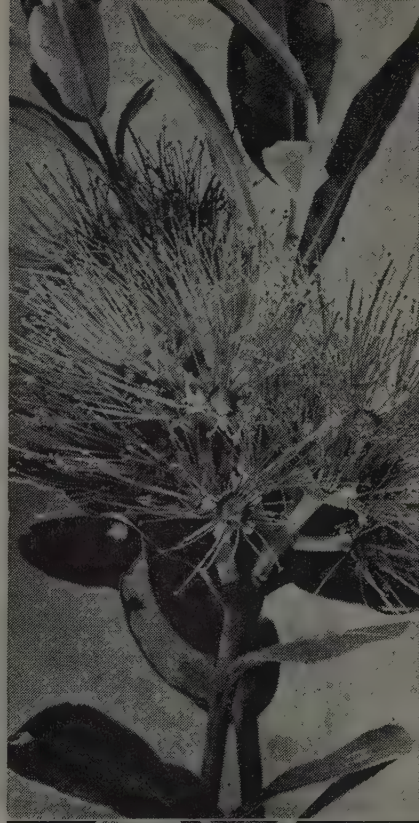
Varieties of Pohutukawa

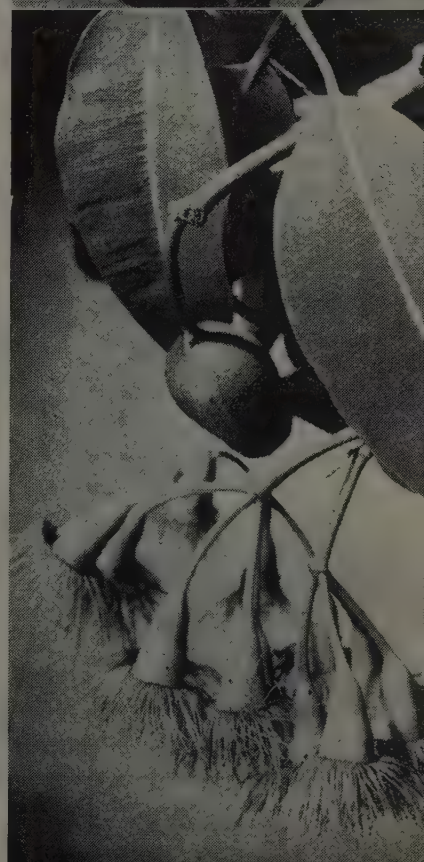
A yellow flowered variety of pohutukawa and a very attractive variegated variety are both obtainable from nurserymen. The variegated pohutukawa has smaller leaves and is slower growing than the ordinary pohutukawa.

The Kermadec pohutukawa *Metrosideros kermadecensis* syn. *M. villosa* from Sunday Island in the Kermadec group is also obtainable. This tree is similar in habit and appearance, but the leaves, flowers, and twigs, however, are all about half the dimensions of the New Zealand pohutukawa. Some specimens of the Kermadec pohutukawa bloom almost throughout the year, but only on odd twigs and branches. A profusion of crimson blossom at one time is not so common in this species as it is in the New Zealand pohutukawa. However, it makes a very good dense windbreak in coastal areas.

Eucalyptus leucoxylon var. *rosea*

Eucalyptus leucoxylon var. *rosea* is sometimes called ironbark, but it is really a white-wood. It is often sold in New Zealand as *Eucalyptus campbelli*. It is a delightful tree with long, pendulous, sickle-shaped leaves and smooth, silvery grey bark which is shed in long, paper-like strips. Most





Right—Foliage and flowers of red flowering trees. Upper—Pohutukawa. Douglas Elliott photo. Lower—*Eucalyptus ficifolia*. National Publicity photo.

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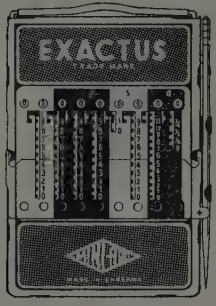

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trees of this species have abundant clusters of cerise or deep crimson flowers, which show to perfection among the silvery grey-green foliage. The flowers are particularly nectariferous and attractive to tuis. It always adds to the charm of a garden to have these melodious birds about. Bees also are particularly fond of this tree.

The tree blooms for 6 months from April to September. It attains a height of from 20ft. to 30ft. and is more compact than the pohutukawa and is therefore more suitable for a smaller garden, but it should be borne in mind that it needs enough room for development and a position where its great beauty of flower and form and slightly weeping habit can be seen and appreciated. This tree prefers a sunny well-drained situation with its roots shaded and is suited to either a clay loam or to a good alluvial soil.

Being a native of New South Wales, Victoria, and South Australia this gum is fairly hardy, but the young plants should be protected in areas where frosts occur. Young plants may be raised from seed or purchased from a nursery.

Crimson Flowering Gum (*Eucalyptus ficifolia*)

Crimson flowering gum (*Eucalyptus ficifolia*) is a real gem of the Western Australian flora; there are few people who have seen this gorgeous plant in full bloom who do not wish to possess one. It should be remembered, however, that the plants are normally raised from seed and because of this there is a considerable variation in flower colour, which ranges from a pale brick red to scarlet and deep crimson. The massed effect of the trusses of large flowers is a sight to remember; and an added attraction is the very large, cup-like oval gum nuts, which are borne on the tree at the same time as the current season's flowers and are a legacy from the previous season's flowers. These are much used for ornamental and decorative work and also by florists. The leaves are fairly large and broad compared to other eucalypts; they are pointed and held in a vertical position and the leaf margins are sometimes bordered by a red vein. This dark foliage contrasts well with the warm, reddish-buff, corky bark of the trunk.

A sunny position is preferred for the crimson flowering gum, and when used for landscape work it should be planted on a hillside or in some position where the full effect of its brilliant flowers can be seen. The tree will grow to a height of from 15ft. to 30ft. and occasionally specimens reach 40ft.

When young the juvenile foliage is frost tender and in districts where there are moderate frosts the plants should be adequately protected in the winter for several years; later it will be found that the plant becomes much more hardy.

A suitable protection from frost can be obtained with a frame large enough to cover the plant. This frame should be covered top and sides with two layers of scrim or sacking and it is better if the two layers can be kept about 1in. apart. This should be placed over the plant at night in winter and removed during the day. None of the material in the frame should be allowed to come in contact with the foliage of the plant, as the frost may strike through and damage the plant.

Propagation of *Eucalyptus* and *Metrosideros* from Seed

Seeds of *Eucalyptus* and *Metrosideros* should be sown in August or September. A good medium for raising plants from seed is 2 parts of good loam (sterilised if possible), 1 part of peat or leafmould, 1 part of coarse river sand (all parts are by volume); ¾oz. of carbonate of lime and 1½oz. of superphosphate should be added to each bushel of the mixture. This should be put into shallow seed boxes and the seed sown lightly on top of the soil. A good covering for the seed is ⅛in. of gravel; just enough to cover the soil. This will enable watering with a hose without disturbing the seed. Much the same effect can be obtained by placing one or two layers of cheese cloth or scrim on top of the soil while watering. After the initial watering the seeds should be kept damp but not wet. A good plan is to water in the morning to allow the seed boxes to dry out slightly before nightfall. A good position for the boxes is on the south side of a wall, and it is well to remember that fresh seed is best.

When seedlings are about 2in. high they should be transplanted into pots. If transplanted into beds, they may be planted 4in. apart each way. In boxes 2in. apart each way is sufficient. The beds or boxes should be shaded at first. Later when about 6in. high the plants may either be set out into permanent positions or into nursery rows. If they are intended to be planted out as large specimens, they should be regularly transplanted until set out into permanent positions.

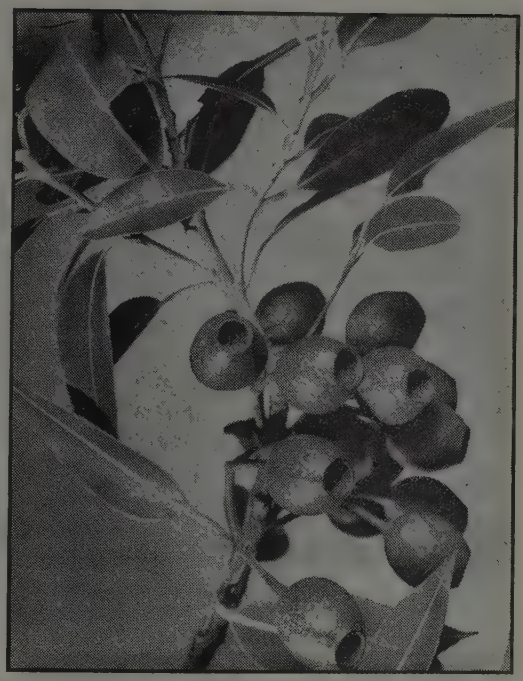
Pests

Pests affecting *Eucalyptus* spp. and *Metrosideros* spp. are:—

The gum tree scale *Eriococcus coriaceus*, a destructive pear shaped scale from Australia, is sometimes found on *Eucalyptus leucoxylon* var. *rosea*. The black ladybird beetle *Rhizobius ventralis*, which was specially imported from Australia, gives very good control of this scale; insectiverous birds also consume large numbers of the scale. If, however, for any reason this scale should become very numerous in spite of its natural enemies, it may be controlled with the following spray: Nicotine sulphate 1 : 800 plus summer oil 1 : 100. To make 4 gallons of the spray the formula is as follows: Nicotine sulphate 5 teaspoons, summer oil ⅓ pint, and water 4 gallons.

Several beetles and weevils and also moth larvae damage the foliage of *Eucalyptus* and *Metrosideros*.

These should be controlled with a spray of D.D.T. 50 per cent. wettable powder, ½lb. in 100 gallons of water, or for small quantities of the spray, ½oz. of D.D.T. 50 per cent. wettable powder, in 4 gallons of water. If the caterpillars are tortrix (leaf-roller caterpillars), it may be better to use D.D.D. 25 per cent. wettable powder 1oz. in 4 gallons of water.



[*National Publicity*

Large, ornamental gum nuts of *Eucalyptus ficifolia* (crimson flowering gum).

Garden Notes for January

Holidays and hot weather combine to lure the gardener away from his plants in January. If the garden has had reasonable attention up to the holidays, dry weather should be the only cause for concern.

Many plants wilt badly when the soil dries out, and watering may make all the difference between keeping or losing them at this time. Mulching during spring and early summer while the ground is still moist helps to keep the roots cool and to hold moisture through the dry summer, but even then watering may be necessary.

Shasta daisies (*Chrysanthemum maximum*) are most useful plants for providing cut flowers during January and February. In large patches their white flowers look cool and refreshing.

Mulching over parched ground later in the season is of little benefit, as it is difficult to wet the ground beneath it.

Restrictions on the use of water for the garden apply in many districts in summer, and watering is limited to a few hours daily. In such cases it is more economical to give a thorough watering to one section of the garden at one time and work gradually round the garden, taking a week or more to water the whole area, than to sprinkle all the garden frequently but inadequately. If no arrangement can be made for watering during a long holiday absence, that practice should be followed just before departing.

It is best not to use sprinklers or nozzles producing coarse sprays which pack the surface soil down, or to direct strong jets of water near the bases of plants where the soil may be washed out, leaving the roots exposed.

Seed Sowing

Seed of perennials and biennials may be sown ready for next year's display. Canterbury bells, wallflower, sweet william, delphinium, and aquilegia can be handled readily by sowing the seed in drills in the vegetable garden. Once the seedlings are about 3in. to 4in. high they can be transplanted either to permanent positions or lined out in rows to grow on for later planting. They should be lifted with a small ball of soil, especially at the second transplanting.

Seed of Iceland poppies may be sown. Plants set out during January, February, and March appear less susceptible to spotted wilt, a virus disease which weakens the plants considerably. Early poppy plantings provide welcome blooms in winter.

Bulbs

Lifting of narcissi and tulip bulbs may be carried out and as lifting proceeds bulbs should be kept shaded to avoid damage from sun scorch. Also, narcissus bulbs left exposed on the surface of the soil for any length of time are liable to attack by the bulb fly, the larvae of which feed on the heart of the bulb, leaving a rotten or useless husk. Bulbs in storage are not likely to be attacked, though it is possible that the bulb fly eggs were present before lifting. For this reason bulbs should always be inspected before replanting and any soft ones discarded. Bulbs damaged during lifting should be destroyed and not stored with the sound ones.

A cool, well-ventilated place is best for storing bulbs. Wire netting racks in a shed are ideal, as they allow free circulation of air around them. Too high a storage temperature may cause the bulbs to divide rather than flower in the following season.

Long, slender necked bulbs as a rule produce only foliage the first year and flower the second year; this is particularly so with tulip bulbs. Plump, well-formed bulbs should be kept for planting out flowering beds. Small or doubtful ones can be kept separate to be grown on elsewhere, if required, for the next season.

Carnations

Cuttings may be taken now, material from healthy plants only being selected. The best pieces to use are plump side shoots whose leaves grow close together. Very thin, lanky shoots root but do not form very satisfactory bushes. They bolt up to single stems and flower without forming a branching plant.

A clean, straight cut should be made on the base of the cutting and the lower 4 or 6 leaves cut away to give a clean stem. All older leaves can be cut back on a level with the heart leaves in the centre. The resulting cutting should then be firmly planted in a previously prepared position.

Alternatively, heel cuttings may be taken, with a portion of the old stem attached, or border carnations may be layered by pegging down side branches and covering them with soil.

Chrysanthemums, geraniums, and hollyhocks from now on will begin to show signs of rust infection. The brown markings on the undersides of the leaves not only detract from the appearance of plants, but with a heavy infection weaken them considerably. As a preventive to check the spread of rust a spray of 4 fl. oz. of lime sulphur plus 1oz. of colloidal sulphur to 4 gallons of water should be used at 14-day intervals.

Where lime sulphur spray is used near buildings care must be taken to see that the spray does not get on the paint, as it causes a brown, unsightly stain which is difficult to remove.

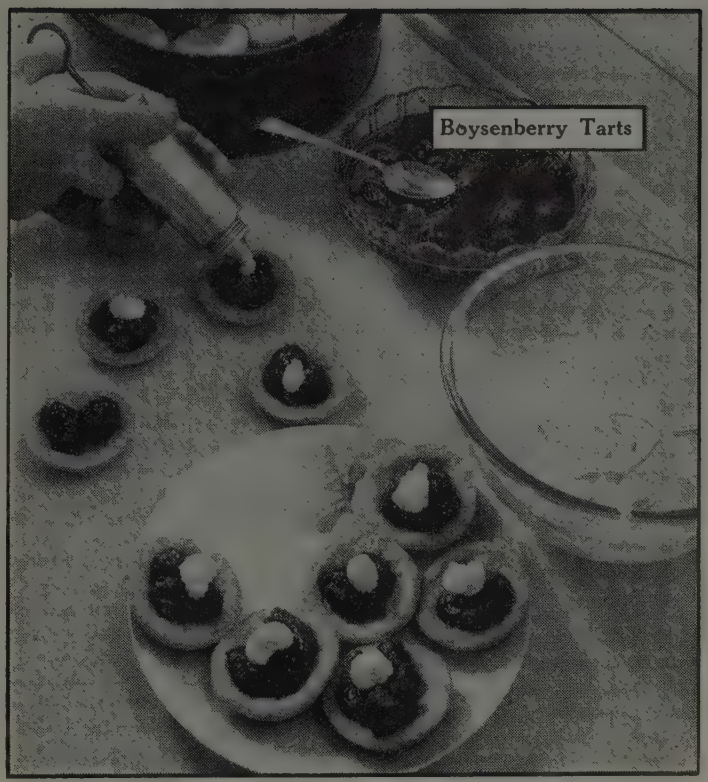
Lawns

Mowing of lawns during summer drought is reduced to a minimum, and it is sometimes possible to omit mowing for weeks on end. In any case the mower blades should be lifted so that cutting is not too close and there is some protective covering of foliage to shade the roots.

It is important to keep the more drought resistant broad-leafed weeds in check to prevent them from smothering patches of grass.

Lavender should be cut when in full bloom, and to retain the maximum scent flower heads should be dried in a warm, airy spot which is not in direct sunlight.

Delicious Sweets from Boysenberries


Boysenberry Tarts

THE boysenberry plant is similar to the loganberry plant in appearance and growth habits and fruits heavily. Because of the heavy crop housewives may often have difficulty in disposing of the fruit and the recipes described below by Nell Macpherson, formerly Field Officer in Rural Sociology, and Lesley Harding, Field Officer in Rural Sociology, Department of Agriculture, Auckland, should help them to make full use of the fruit.

BOYSENBERRIES ripen in December and January, changing to a very dark wine-red colour which becomes almost black when the fruit is ripe. They are soft and juicy with a tart flavour.

They can be used in place of other berry fruits in recipes and as with these fruits need to be picked at different stages of ripeness for different purposes. The berries keep longer if picked dry. They can be eaten raw as well as cooked.

Like other berry fruits boysenberries often have little grubs on them which are very hard to pick out. One way of dealing with these is to put the berries into a bowl of brine made by adding 1 dessertspoon of salt to each pint of water and leave them until the grubs come out. The brine is then poured off and the berries rinsed with water before use.

Boysenberry Meringue Shortcake

Raw Fruit

Boysenberries with Cream

Pick fully ripe berries and discard any that are unsuitable. Serve with icing sugar and cream.

Boysenberries in Sugar Syrup

Put a layer of boysenberries in a bowl and sift a thin layer of sugar over them. Continue with alternate layers of berries and sugar, finishing with a layer of sugar. Leave the fruit in a cold place for at least 12 hours before serving to allow it to express some of its juice. Serve the berries with cream and additional sugar if required.

Fresh Boysenberry Drink

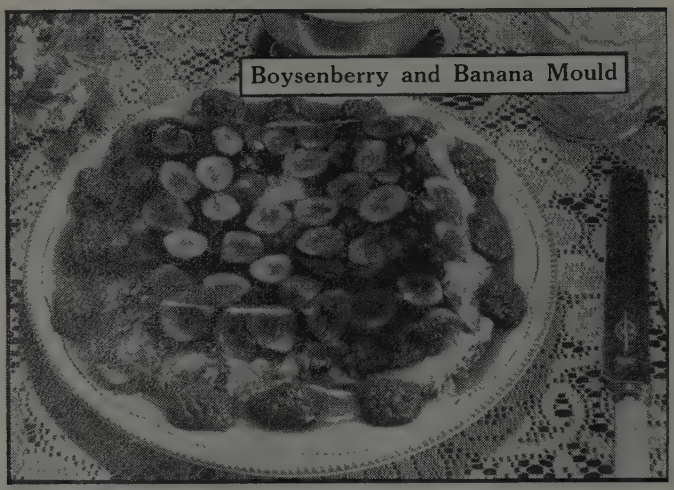
Crush some very ripe boysenberries. For each cup of pulp allow 1 cup of water and 2 tablespoons of sugar. Boil the sugar and water to a syrup (5 minutes) and add this syrup to the crushed berries. Stir the mixture well and allow it to cool. Chill the drink if possible. Add 1 teaspoon of lemon juice to each pint of prepared drink and serve.

Boysenberry Fool

1 cup of crushed boysenberries
1 cup of medium thick custard

Custard

1 cup of milk
1 tablespoon of sugar
1 dessertspoon of custard powder



Mix the custard powder and sugar to a thin cream with some of the milk. Heat the remainder of the milk and add it to the custard powder mixture. Return the mixture to the heat and stir until it thickens. Add the boysenberry pulp to the custard, stirring them until they are properly blended. Pour the mixture into a bowl and allow it to cool.

Cooked Fruit

Boysenberry Tarts

8oz. of flour
4oz. of fat (½ lard and ½ butter)
¼ teaspoon of salt
Preserved boysenberries
Whipped cream

Pastry cases: Cut the fat into the flour with two knives or a pastry blender until the mixture has the consistency of coarse breadcrumbs. Sprinkle cold water on the mixture and mix it lightly to form a stiff dough. Roll the dough out to a thickness of ⅛in. to ¼in. and cut it into circular shapes. Place these shapes in patty pans, prick them, and cook them for 10 to 15 minutes in a hot oven (400 degrees F.).

Fill the cooled cases with preserved boysenberries from which the syrup has been drained. Decorate the tarts with whipped cream applied through an icing forcer.

Boysenberry Meringue Shortcake

Shortcake

4oz. of flour
2oz. of cornflour
4oz. of butter
3oz. of sugar
1 egg yolk
1 tablespoon of cream or top milk
Boysenberry jam

Meringue

1 egg white
Pinch of salt
1 tablespoon of sugar

Shortcake: Sift the flour and cornflour into a basin and rub in the butter. Add the sugar and mix to a firm dough with the egg yolk beaten into the cream. Turn the mixture on to a floured board and roll it into a rectangular shape ⅛in. thick. Place it in a greased baking dish lined with greased paper. Prick it all over and bake it in a hot oven (400 degrees F.) for 30 to 40 minutes. Turn it out and cool it on a rack. Spread the shortcake with the boysenberry jam.

Meringue: Beat the egg white until it is foamy and add the pinch of salt and ½ the tablespoon of sugar. Continue to beat the mixture, adding the remaining sugar gradually until the mixture forms peaks which just turn over. Pile it on top of the jam filling and bake the meringue in a moderate oven (375 degrees F.) until it is faintly brown.

Boysenberry and Banana Mould

1 packet of red jelly crystals
2 to 3 bananas
Boysenberries
1 cup of pouring custard made from custard powder

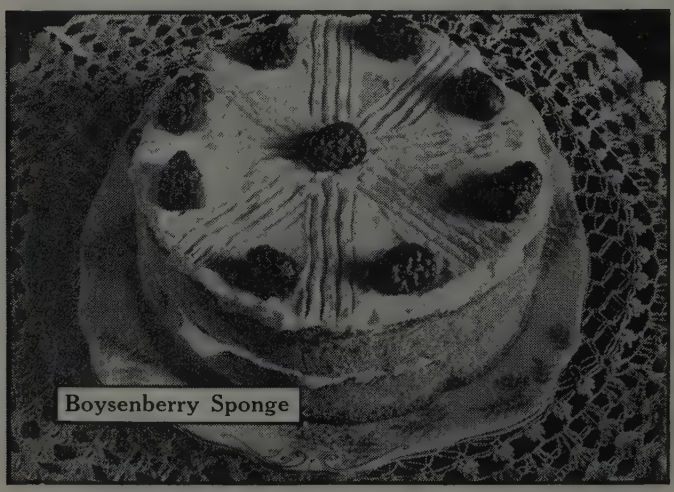
Arrange the sliced bananas in a mould and pour over them the jelly prepared according to the instructions on the packet. Leave these until the jelly is half set and then tip a mixture of the pouring custard and drained, preserved boysenberries into the mould. Chill the mould until the jelly is completely set and then unmould it. Serve it with preserved boysenberries arranged around it on the plate.

Boysenberry Sponge

3 eggs
3 tablespoons of flour
½ teaspoon of baking powder
½ teaspoon of vanilla flavouring
3 tablespoons of sugar
1 tablespoon of cornflour
A pinch of salt

Beat the eggs, sugar, and salt together until the mixture is thick and lemon coloured. Add the vanilla essence during beating. Sift the dry ingredients three times and lightly fold them into the beaten eggs and sugar. Pour the mixture into two 8in. sandwich tins and bake it in a hot oven (400 degrees F.) for 20 minutes.

Filling: Mash boysenberries with whipped cream and spread the mixture on to the lower layer. Spread whipped cream over the top of the cake and decorate it with boysenberries.

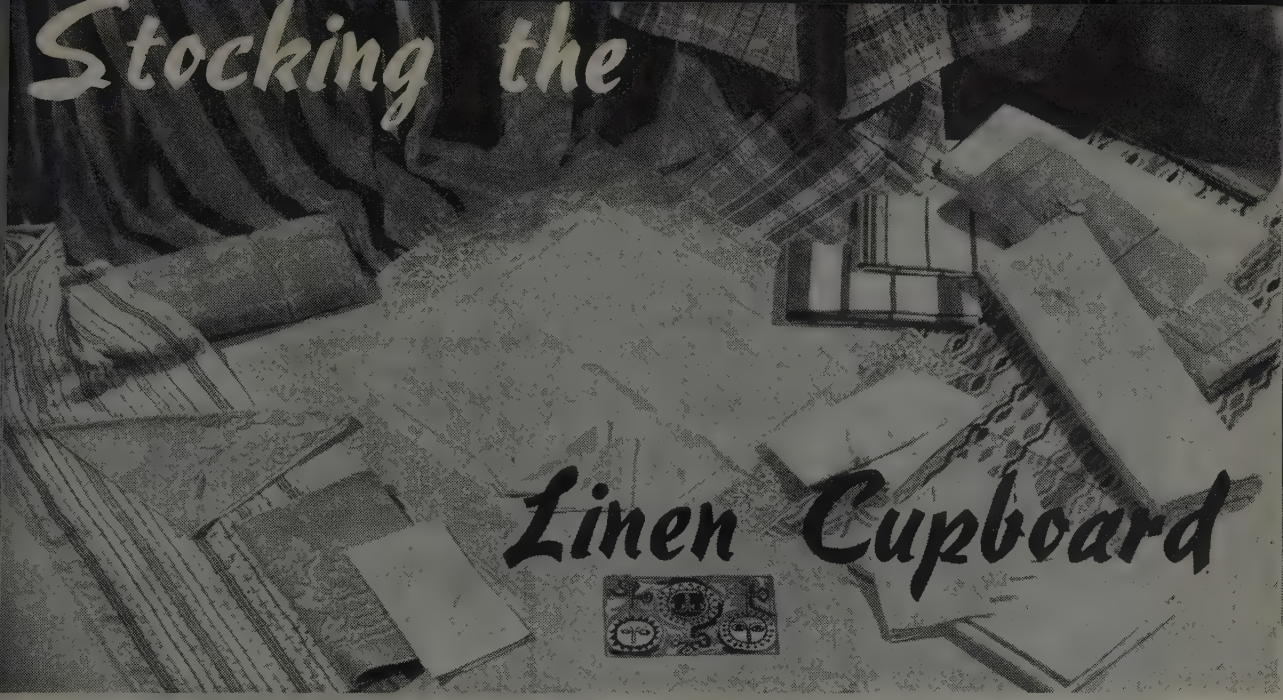


Boysenberry Jam

Clean, sort, and weigh barely ripened boysenberries. Add enough water to them to prevent the berries from sticking and cook the fruit until it is broken up. Add 1lb. of sugar for every pound of prepared boysenberries and boil the mixture briskly until it falls off the spoon in sheets. Tip the jam into hot, sterilised jars after it has been allowed to cool slightly and cover the jars.

Preserved Boysenberries

Pick over the berries, discarding any that are overripe, clean them, and pack them into sterilised jars. Make a thin syrup by bringing to the boil a mixture of 1 cup of sugar to 3 cups of water. Pour this over the berries to within ½in. of the tops of the jars. Put lids on the jars and place them in a water bath. After the water comes to the boil leave the jars for 50 minutes in the gently boiling water. Remove them, allow them to cool, and after 24 hours test the seals.



Stocking the Linen Cupboard

THE bride stocking a linen cupboard for her new home and the homemaker replenishing her household linen supplies have several problems in common. The homemaker certainly knows her requirements, whereas the bride may be uncertain about the quantities of each article that she will need to buy. Each, however, has to decide how much she can afford to spend and will have to plan her purchasing accordingly. In this article Betty Johnston, Field Officer in Rural Sociology, Department of Agriculture, Wellington, discusses the important points involved in budgeting for and buying household linen.

BEFORE buying household linen it is advisable to make out a rough budget, as the amount of money available largely controls the quality and quantity that can be bought.

The next step is to choose colour schemes. Bed linen, towels, and tea towels are no longer a staid and useful white, but are appearing in a wide variety of colours and designs which may be chosen to match the colours of bedrooms, bathroom, and kitchen. Pastel-coloured sheets may be teamed with blankets of the same shade to emphasise or complement a colour scheme, and white sheets with a coloured border and matching white blankets bound with coloured satin make a more subtle contribution to colour harmony.

Striped bed linen has made news overseas, and small quantities have been imported into this country. Linen and cotton must be dyed with good dyes, or their colours will wear off with constant friction (this is known as "crocking") and in laundering. The best safeguard against this is to buy a good quality of a well-known brand. The guidance of a salesman in a firm with a good reputation may usually be relied on, for it is to the advantage of his firm to preserve its good name by providing reliable goods.

A good-quality cotton or linen which will wear well is closely woven and fine in appearance. The surface is smooth and even, and when the material is pulled it will stretch only very slightly. When a good material is held at eye level very few tiny hairs will show, but a poor-quality one will be quite hairy. Linen fibres are long, and when spun into yarn and woven give a fabric which has a smooth, glossy appearance and is hard wearing, reasonably dirt resistant, and launders well. A good-quality cotton, however, costs less, will wear and launder quite well, and is a good choice for most households.

Wherever possible the best quality should be bought, as the cheaper grades are often made from inferior yarns which have a shorter life and do not stand up well to the wear and tear of everyday household use.

Other considerations are involved, too. The finest quality linen sheeting is often scarce and very expensive. Though it may be used regularly for years without showing signs of wear, and though one linen sheet will probably outlast two cotton sheets and in the long run cost no more than a cotton pair, the immediate cost may be too great for a slender budget despite the linen's obvious advantage in quality, so a compromise will be necessary.

The expense of setting up house is considerable and the shopper might well pause for thought before buying sheets, towels, and the rest of her linen. The numbers of each item will vary according to the size of the household, laundry facilities, and the amount of entertaining done. Those who have small children realise how necessary it is to have a reserve of sheets, towels, and pillow-cases for emergencies such as sudden illness or prolonged wet weather.

The list given here is intended as a guide for those setting up house, but individual requirements will probably vary slightly.

MINIMUM LINEN FOR A NEW HOUSE

Sheets: 3 pairs for each bed. For beds not in regular use 2 pairs should be sufficient

Pillow-cases: 3 for each pillow. If there is sufficient money left after the rest of the linen has been bought, it could be wisely invested in extra pillow-cases and tea towels, as these items need to be replaced frequently

Blankets: 4 for each bed

Bath towels: 3 for each person. Two or 3 spare bath towels for each guest

Face towels: 3 for each person and guest

Guest towels: 4

Bath mats: 2

Table cloths: 3 (1 large white one and 2 smaller coloured breakfast cloths)

Table mats: 1 or 2 sets. These need not be linen. Hardboard or rattan make attractive, hard-wearing, easily cleaned mats which save much laundry time

Table napkins: 3 for each person

Roller towels: 3; it is suggested that 3 more towels be bought as soon as possible, as these towels need frequent washing and soon wear out

Tea towels: 8 heavy grade and 4 finer ones for use with glass

Bed Linen

Sheets or pillow-cases may be coloured or plain; the type of fabric depends on individual needs and preference. Cotton, linen, and rayon or mixtures of these fibres (unions) are all used for making bed linen, and overseas, nylon has been tried as sheeting. The most popular choice in New Zealand is cotton.

Weave is a factor in the lasting quality of sheeting. A loose, open weave will soon show signs of wear, especially if the yarn is flimsy. Plain

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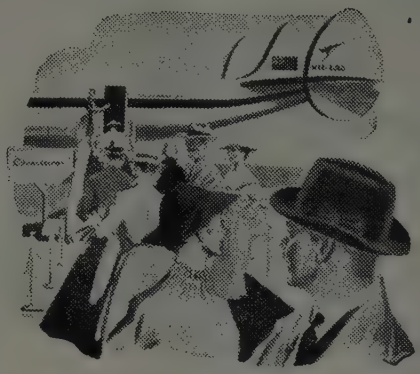

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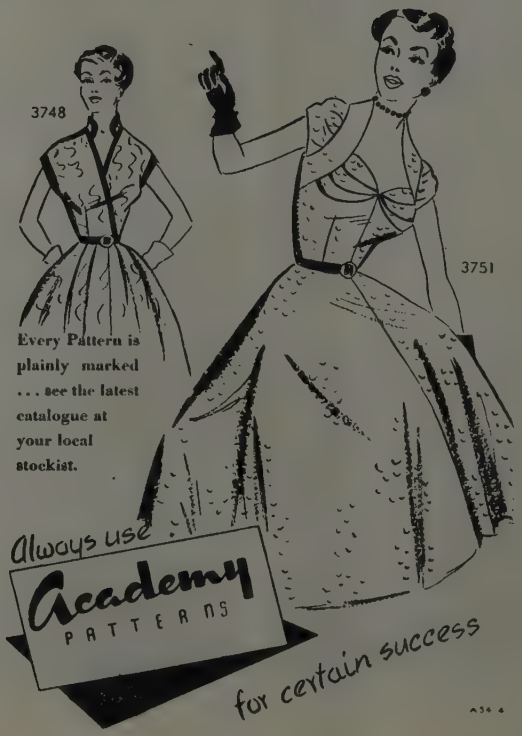


weave has the warp (lengthwise) and weft (vertical) yarns interlacing evenly one over the other at right angles, producing a smooth, even-surfaced fabric (see illustration at right). Twill weave has the weft or filling threads crossing over two or three of the warp threads, and going under one. For example, a pattern of two over and one under is woven so that each of three rows begins at a different place in the pattern. This results in a diagonal effect on the finished fabric. Because some of these filling threads are longer than in plain weave, twill fabrics are more prone to wear. Manufacturers often overcome this difficulty by using a heavier grade of yarn.

Some people who feel the cold may choose sheets of fluffy, napped cotton for winter use. Because this material is fluffy, it soils easily, the dirt being trapped in the fuzz on the surface of the fabric. These sheets take longer to dry than ordinary cotton ones, but they are warm and cosy in cold weather.

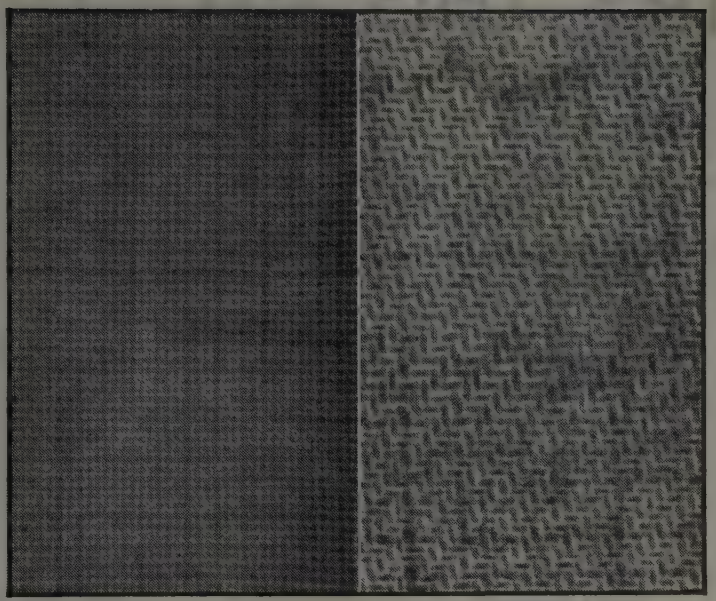
Sheets should be of sufficient length and width to allow for tucking in.

Pillow-cases are made either with tapes or with envelope ends (see illustration below). The latter type uses more material and is therefore slightly more expensive, but pillows are better protected from soiling and the replacing of ripped off or hopelessly knotted tapes (a frequent occurrence in some households) is avoided.

Pillow-cases should be 2in. or 3in. longer than the pillow, measured from seam to seam, and about 1in. bigger in girth. The average size of a pillow-case is 22in. x 34in.

Hems

Hems of sheets and pillow-cases should be neat and even and the stitching small enough not to come undone when the articles are in use. Hemstitching gives a finish to sheets. Some exquisite hemstitching has been done on linen sheets that have lasted a lifetime, but for busy people and for those who have not the patience to spend hours on fine embroidery machine hemstitching is sufficient to make ordinary sheets look special. The stitching of hems of sheets and pillow-cases is undone and a tacking thread run along to hold the turn over in place. The hemstitching may be done on a machine with a special attachment at home or in a needlework shop in town.



Different linen weaves. Left—In plain weave the warp and weft threads interlace to give a smooth, even surface. Right—In twill weave the weft yarn crosses two warp threads and goes under one, progressing by one thread in each new row of weaving. This gives a diagonal pattern effect.

Blankets

New Zealanders are lucky that several brands of excellent blankets are made in this country. A good quality is not difficult to find, and costs, though they fluctuate with wool prices, are reasonable. Pure wool is the best fibre for blankets, as it is light yet warm and will absorb moisture without feeling damp. Air-cell blankets have a honeycomb appearance and are comparatively light in weight, but very warm. This is because air is trapped in the meshes of the woven fabric and acts as an insulator, keeping body warmth from escaping into the outside air. Air is enmeshed in the fuzzy hairs of wool in ordinary blankets too, acting in the same way to maintain warmth. If blankets, through repeated or harsh washing, become solid and felted, some of this air-trapping quality is lost and so the blankets fail to hold much warmth.

Mohair blankets or bedcovers, probably a luxury to most people, are extremely warm and light. One of these blankets can be used instead of two ordinary blankets and makes an attractive bedcover.

Envelope pillow-cases are better than ordinary pillow-cases for protecting pillows.

Bedspreads

Bedspreads should be washable or easily cleaned and ironed, as, apart from being decorative, they are used to stop dust and dirt from soiling the blankets. When bedspreads or material for making them are being bought allowance should be made for shrinkage and, if possible, material should be pre-shrunk before it is made up. A fairly close weave should be satisfactory; fancy weaves usually have long filling (or "float") threads in the patterns and these tend to catch and wear. A colour-fast material is essential. Seersucker is a good choice

TRY THIS DELIGHTFUL NEW RECIPE

This is a particularly good recipe, confidently recommended by T. J. EDMONDS LTD.

FRUIT BOMBE

2 eggs
1 dessertspoon (rounded) gelatine
1 tablespoon Edmonds Cornflour
1 tablespoon sugar
1 pint milk
Vanilla Essence
1 packet Edmonds Jelly Crystals (Red)
2 cups (breakfast) hot water
1 extra tablespoon sugar
Berries and bananas for garnishing

Separate whites and yolks of eggs. Soften gelatine in 3 tablespoons of boiling water. Combine cornflour, sugar and egg yolks and blend smoothly with ½ breakfastcup of milk. Heat remainder of milk and pour on to blended ingredients. Return to saucepan and stir until mixture thickens, cook a few minutes longer. Cool, then stir in gelatine. Add egg whites stiffly beaten with extra tablespoon of sugar, flavour with vanilla. Pour into a wet mould. Dissolve jelly crystals in the hot water, and when mould is quite set, pour the hot jelly down the sides of the mould and leave to set. Turn out and garnish with berries in season and slices of banana dipped in lemon juice.

This recipe calls for the use of Edmonds Pure Maize Cornflour, and Edmonds Jelly Crystals. We cannot guarantee results unless these are used.

T. J. EDMONDS LTD., CHRISTCHURCH

Table mats. Top left—Pure linen with a modern design. Top right and centre—Neutral-coloured Chinese rattan mats. Bottom—Checked, fringed, linen-finished rayon with machined edges. Right—Hardboard mats with a hunting design and a heat-resistant varnish finish.

for children's beds and many pleasant colours and patterns are to be found in this material.

Eiderdowns

Eiderdowns are an expensive item and may, if preferred, be bought later. They should not be heavy, as down feathers are very light. If an eiderdown is heavy, it is probably not stuffed with feathers but with wool or cotton padding, or it may have two covers, that is, a new one over an old one. When eiderdowns have been re-covered the old cover should have been discarded, not left underneath, as this adds considerably to the weight. All eiderdowns should be covered with down-proof material to prevent the escape of feathers.

Towels

Towels and Bath-mats

Most towels and bath-mats are made of turkish towelling. This material has a large number of loop threads standing above the woven surface of the ground fabric, and the absorptive capacity depends on the density of these loop threads. The loops should be close together and thick enough to prevent moisture saturating the ground weave. The strength of the towel comes from the ground or body weave. This can be checked by holding the towel against the light. Only very small spots of light should be visible if the weave is close and uniform. The selvedges should be firm and the hems firmly and evenly stitched. Fringed edges are apt to fray and do not last as long as stitched edges. Linen is the most absorbent material used for towelling, but is rarely obtainable nowadays. A good-quality cotton has proved most satisfactory. Towels, face cloths, and bath-mats have been made in many colours and designs which make the matching of bathroom colour schemes easy.

An old damask pattern on a linen table napkin.

Guest towels are made of huckaback or towelling in many attractive shades, some embroidered or hemstitched.

Tea Towels and Kitchen Towels

Linen is also the ideal material for tea towels because of its absorbent powers, and its hard-wearing qualities allow for much laundering. Cotton is apt to "fluff" and leave cottony smears on glass and silver and will not wear as long as linen. It is usually easier to dry glass with a lighter-grade linen tea towel, but the weave, as in the heavier-grade general-duty towel, should be close, even, and firm.

Roller Towels

Roller towels are normally of cotton turkish towelling and can be chosen in some of the many bright and attractive colours designed to make the kitchen brighter and more cheerful. Dark colours are better than light ones, which show dirty marks too easily.

Kitchen Articles

Pot Holders and Oven Cloths

Articles such as pot holders and oven cloths are usually made from a sugar bag or scrap materials from the family rag bag, but one or two points are worth noting before the articles are made.

All cloths which are designed to hold hot dishes should be sufficiently thick to prevent burns, and sugar bag material, though it is quite good for holding hot pans, is very poor protection against hot steam. A nasty burn may be prevented by using a mit or cloth made of several thicknesses of quilted cotton with, perhaps, an inner lining of flannel. Steam will not penetrate this type of cloth as easily as it does the coarse, open mesh of sugar bag material. An added safety measure is the use of two oven cloths

at once. This allows free movement without restriction when big, heavy pots and pans are being lifted. Again, quilted cotton with a flannel interlining made into mits or oblong bags gives better protection to the hands than do plain sugar bag or burlap cloths. Also, there are no trailing edges to catch on door handles or projecting parts of the stove.

Dishcloths

For a dishcloth each person has her personal preference, either for a cotton mop or a plastic sponge as well as some kind of cloth for drying the benches and sink. A coarsely woven, knitted material with finely finished edges (to prevent unravelling) is easy to use and to keep clean. Plastic materials have been made into brightly coloured and most efficient dishcloths, but if these are needed for mopping up spilt milk, they must be rinsed immediately; otherwise a most unpleasant smell which is very difficult to remove will develop.

Table Linen

Linen holds pride of place for table use. Table cloths, dinner and lunch mats, and table napkins look and wear best when made of linen. Nothing looks better than a dinner table set with a white damask cloth, silver, and crystal. Unfortunately, there is nothing which takes so much time to iron as a starched, damask linen table cloth. For this reason, perhaps, table mats of many hues have become a popular substitute for the white table cloth of grandmother's days, though most people have clung to the conservative white linen damask table napkins. Damask is a type of woven patterned fabric, double damask being finer and having more "body" than single damask. It also lasts longer. It is possible to buy double damask table napkins in one of the old conventional designs such as the one illustrated on page 651 for less than a single damask napkin of a new and unusual design. As often happens new designs have to be paid for, and the cost of the first article of any unusual pattern is often greater than it will be later.

Rayon is often used for table linen and there are some very pretty cloths and mats in either pure rayon or a mixture of rayon and cotton. These are easier to launder and iron than pure linen and do not need the heavy starching so often necessary to keep cotton materials looking their best. One serious disadvantage of rayon is its unfortunate habit of spotting with grease or other staining substances. These grease spots are difficult to remove, having an infuriating tendency to disappear when washed, only to show up again when the materials are ironed. Rayon wrinkles fairly easily too, but is easily pressed into shape.

Lace mats are usually made of pure, strong cotton, and have a good appearance, are easy to keep, and do not readily show dirty marks. Felt protecting mats are needed underneath them when they are used on polished tables. Many people have discovered the usefulness of washable hardboard or rattan table mats, and these save much laundry time.

A good, mild bleach is best to keep white table linen free of stains, but this is not possible with coloured materials. An all-over pattern of a serviceable yet gay colour is the best compromise for everyday use. When coloured table mats are used the table napkins should either match or contrast. Small hemstitched or embroidered napkins to match similar mats look very well, though white damask napkins can be used at any time. Brightly checked gingham napkins can be made to match checked breakfast cloths, their hems needing only to be straightened and machine hemmed.

Tray Cloths and Tea Cloths

Tray cloths and tea cloths will vary in number and type according to individual taste. The best looking are probably of embroidered and hemstitched white linen, worked in white thread, but coloured linen and coloured patterned materials have their place in every household. Any embroidery on household linen should be in colour-fast cottons, and materials worked in self colours or in soft, neutral colours look best. An example of this is the well-known Madeira embroidery.

Replacements

If possible, it is advisable to keep up linen stocks and so avoid having to renew all the sheets or towels or pillow-cases at once. If a well-known brand is bought, there should be no difficulty in matching linen, though some of the more unusual designs, for example in towels, may be more of a problem.

Spreading replacement of worn linen throughout the year makes it easier to budget for this item in the household expenses; small quantities being bought with surplus money and put away until they are required. This is not always possible, but it is a good plan to try to follow.

Double Doors on a Soiled-linen Cupboard

THE cupboard shown is built into a bathroom for use as a soiled-linen cupboard. There are no shelves and the door has been divided so that only the top need be opened when soiled clothes are thrown in, but when the two doors are opened articles are easily removed for washing and the cupboard may be cleaned without difficulty.

The bench space above the cupboard is also useful for the temporary disposal of various small toilet articles, a convenience lacking in many bathrooms.

—E. E. MOORE, Field Officer in Rural Sociology, Department of Agriculture, Palmerston North

Farm Holidays for Heritage

Heritage children, like all others who normally live in the cities, benefit greatly from an annual holiday in the country. This year the Wellington branch of Heritage is endeavouring to place a limited number of urgent cases on suitable farms for 2 or 3 weeks. The branch is prepared to pay for suitable accommodation for children and their mothers, who often need the change as much as the children.

The immediate problem is to find suitable accommodation for the forthcoming Christmas holidays, but the need extends to the May and September school holidays also. Farmers and country people who feel that they could take one or more children at any of these times are invited to write to the Secretary of Heritage, Box 1238, Wellington, or to telephone 42-197 Wellington.

Quickly Prepared Snacks

IT is sometimes a problem to prepare an appetising supper or light tea meal at short notice when unexpected guests arrive Every housewife has her own favourite snacks which she is able to prepare very quickly, but it is always handy to have a few recipes in reserve to serve for a change.

THE recipes given here are all simple and require little preparation, can be made from left-overs, and are readily adaptable should some of the ingredients not be available.

Luncheon Meat Savoury

4 rounds of bread
4 slices of luncheon meat or other cold meat
4 slices of apple cut in rings
Grated cheese
Tomato sauce

Toast the bread lightly, place a slice of the meat on each round, top with a ring of apple sprinkled with grated cheese, and place under the grill. When the cheese is browned and the apple softened (approximately 5 minutes), garnish with a little tomato sauce. Serves 4.

Sausage Splits

1 to 6 cooked sausages
4 to 6 buttered rolls or bread slices
2 thinly sliced bananas
Thin slices of cheese
Chutney

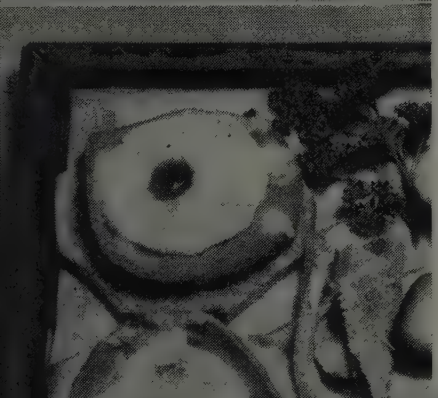
Slit the sausages lengthwise. Put half sausages on to pieces of buttered roll or bread slices. Place slices of banana alternately with slices of cheese along each half sausage. Place under the grill for 5 to 7 minutes and serve immediately. Serves 4.

Hot Dog Variation

Chutney, savoury spread, apples, or horseradish sauce
Thin slices of bread
4 cooked sausages

Cut the bread into 2in. squares. Spread each piece with butter and chutney or one of the other spreads mentioned. Cut the sausages in halves and place a piece diagonally on each square of bread. Roll up and secure with a toothpick. Place under the grill and heat until the bread is golden brown. Serves 4.

—DAPHNE EILERS,
Field Officer in Rural Sociology, Department of Agriculture, Auckland



Above—The ingredients and kitchen utensils necessary for the preparation of the snacks described here. Below—The snacks ready for serving. Sparrow photos.

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